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Timber Resource of Michigan's Northern Lower Peninsula, 1980

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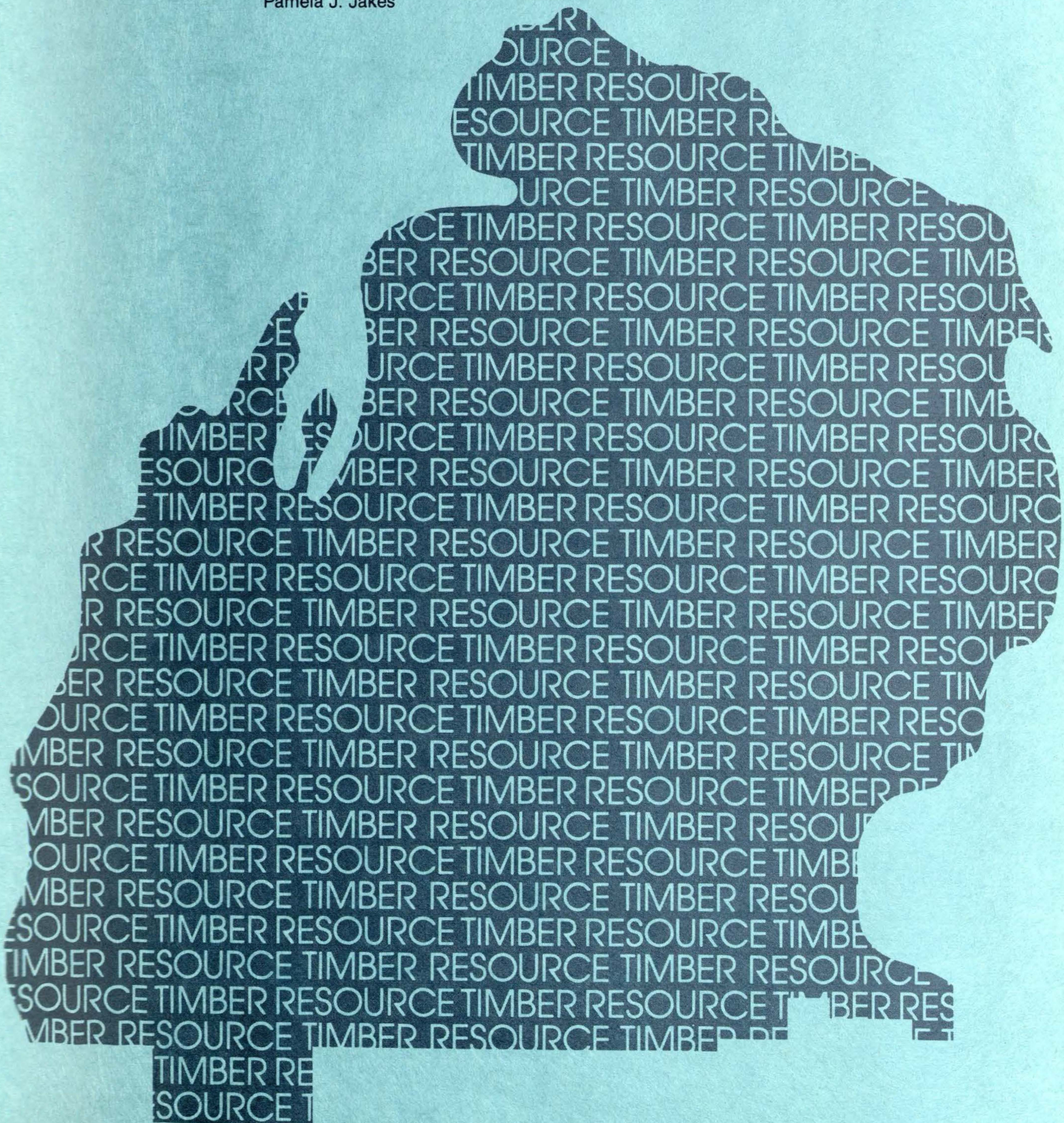
TIMBER RESOURCE TIMBER RESOURCE TIMBER RESOURCE

Information contained in this report includes the most commonly used Resources Evaluation statistics. However, additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay for the retrieval costs. These costs will vary depending on the complexity of the request, from less than $100 for a relatively simple request to $2,000 for a complex retrieval involving the services of a Resources Evalution computer programmer. If requests for data conflict with ongoing Resources Evaluation work, requests will be scheduled so as to minimize the impact on the work unit.

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FOREWORD

Resources Evaluation (formerly called Forest Survey) is a continuing endeavor as mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974, which was preceded by the McSweeney-McNary Forest Research Act of 1928. Its objective is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and depletions. This kind of up-to-date information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual states. The North Central Forest Experiment Station is responsible for Resources Evaluation work done in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, eastern South Dakota, and Wisconsin.

Fieldwork for the 1980 Northern Lower Peninsula forest inventory was begun in January 1980 and was completed in January 1981. Reports on the three previous surveys of Michigan's timber resource are dated 1935, 1955, and 1966. Similar Resource Bulletins reporting statistical highlights and detailed tables on the other Survey Units in Michigan (see cover) are or soon will be available. In addition to these statistical reports, a series of analytical reports will also be published.

More accurate survey information was obtained during the 1980 survey than otherwise would have been feasible because of intensified field sampling. Such sampling was made possible by additional funding and field personnel provided the North Central Station through the Michigan Department of Natural Resources and by interested forest industry members. Data from the Department's canvass of all primary wood-using plants in the State was used to help estimate the quantity of timber products harvested in Michigan.

Aerial photos used in the Northern Lower Peninsula Forest Inventory were furnished by the Michigan Department of Natural Resources and the USDA Agricultural Stabilization and Conservation Service.

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TIMBER RESOURCE OF MICHIGAN'S NORTHERN LOWER PENINSULA, 1980

Pamela J. Jakes, *Resource Analyst*

HIGHLIGHTS

Forest Area

- Forest land accounted for 6.9 million acres (61 percent of the Unit's land area) in 1980, compared to 7.0 million acres (62 percent) in 1966.
- Commercial forest land occupied 6.7 million acres (97 percent of the forest land) in 1980, compared to 7.0 million acres (99 percent) in1966—a 4-percent decline.
- Productive-reserved forest land totaled 147,000 acres in 1980, compared to 62,100 acres in 1966. Additions since 1966 include the Sleeping Bear National Lakeshore, military reservations, State sharptail grouse management areas, and State Parks.
- Cheboygan County contained the largest area of commercial forest in 1980 (366,600 acres) as it did in 1966 (337,200 acres).
- Farmers and miscellaneous private individuals owned 3.4 million acres (51 percent of the commercial forest) in 1980, compared to 4.1 million acres (59 percent) in 1966.
- The aspen, maple-birch, and oak-hickory forest types continue to dominate the commercial forest land base in 1980 as they did in 1966.
- More than one-third of the privately-owned commercial forest has been owned by its present owner 20 years or more.
- Poletimber stands occupied 47 percent of the commercial forest in 1980 as compared to 51 percent in 1966.
- Sawtimber stands—the area of which increased by 288,400 acres between surveys—amounted to 22 percent of the commercial forest in 1980, compared to 17 percent in 1966.

Timber Volume

- The volume of growing stock in 1980 was 6.8 billion cubic feet, 38 percent more than the 4.9 billion[1] in 1966.
- Sawtimber volume amounted to 15.1 billion board feet[2] in 1980.
- The 5.1 billion cubic feet of hardwoods make up 75 percent of the growing-stock volume.
- The maples (1.4 billion cubic feet), aspens (1.3 billion), and oaks (1.2 billion) contain the highest volumes and together account for more than half of the growing-stock volume.
- Average growing-stock volume per acre in 1980 was 1,019 cubic feet, compared to 707 cubic feet in 1966.
- Thirty-four percent of the growing-stock volume is in stands aged 41 to 60.
- Nearly three-quarters of the sawtimber volume is in grade 3 saw logs.
- The volume in cull trees (rough, rotten, and short-log cull) is 453 million cubic feet; salvable dead tree volume is 230 million cubic feet.

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[1]*Published 1966 volumes were adjusted by factors derived from 1980 volume equations to make volumes for the two inventories comparable.*

[2]*International ¼-inch rule.*

Stand Conditions

- Net annual growth on growing-stock trees was 263 million cubic feet in 1979, compared to 196 million in 1965.
- The net annual growth rate of growing stock was 3.9 percent of inventory in 1979, compared to 4.0 percent in 1965.
- Net growth averaged 39.3 cubic feet per acre in 1979—28.0 cubic feet per acre in 1965.
- Annual mortality of growing stock amounted to 52 million cubic feet (0.8 percent of inventory) in 1979, compared to 25 million (0.5 percent of inventory) in 1965.
- Disease accounted for 34 percent of the mortality in 1979—chiefly diseases of aspen and elm.
- Fifty-five percent of the commercial area can grow trees 61 feet and taller at age 50, and 31 percent of the area can grow trees 71 feet and taller at the same age.
- Stands aged 50 or less declined from 70 percent of the commercial area in 1966 to 54 percent in 1980.

Timber Use

- Timber removals from growing stock in 1979 totaled nearly 105 million cubic feet (1.5 percent of inventory), compared to 78 million cubic feet (1.6 percent of inventory) in 1965.
- The aspens made up 43 percent of the 1979 removals volume, although they accounted for only 19 percent of the growing-stock volume.
- Output of roundwood products totaled 106 million cubic feet in 1978; 43 percent of this output was pulpwood and 37 percent was saw logs.
- Wood residue from primary plants totaled 17 million cubic feet in 1978, of which 3 million were not used.

Biomass

- Live tree biomass (trees more than 1 inch in d.b.h.) totaled 369 million green tons (55 tons per acre) in 1980, more than one half in the boles of growing-stock trees.
- Live shrub biomass (including trees less than 1 inch in d.b.h.) was highest in the tamarack forest type where it amounted to 1.6 tons per acre (green weight) in 1980.

APPENDIX

ACCURACY OF SURVEY

Resources Evaluation information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the Northern Lower Peninsula Unit in 1980, 6,824.7 million cubic feet, has a sampling error of ± 1.21 percent (± 82.6 million cubic feet). The growing-stock volume from a 100-percent inventory, then, would be expected to fall between 6,742.1 and 6,907.3 million cubic feet (6,824.7 ± 82.6), there being a one in three chance that this is not the case. Sampling errors were calculated separately for National Forest land and other land because of the difference in the way the inventories were conducted. For example, the sampling error for growing-stock volume on land other than National Forest is ± 1.31 percent but for Huron National Forest land it is ± 5.54 percent and for the Manistee ± 3.53. Different survey procedures resulted in different sampling errors.

The following tabulation shows the combined sampling errors for the 1980 Northern Lower Peninsula Forest Inventory:

Item	Unit totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume	6,824.7	1.21
Growth	263.0	1.67
Removals	104.5	13.40
Sawtimer	(Million board feet)	
Volume	15,082.2	1.90
Growth	903.3	2.88
Removals	325.3	15.50
Commercial forest land	(Thousand acres)	
Area	6,694.9	0.53

As survey data are broken down into sections smaller than State or Survey Unit totals, the sampling error increases. The smaller the breakdown, the larger the sampling error. For example, the sampling error for growing-stock volume in a particular county is higher than that for total growing-stock volume in the Survey Unit (table 74 shows the sampling errors for estimates smaller than Unit totals).

SURVEY PROCEDURES

The major steps in the survey of the Northern Lower Peninsula Unit were as follows:

1. A total of 56,382 1-acre points were systematically distributed across aerial photos of the entire Unit, except the Huron and Manistee National Forests. These points were classified into land classes as shown below, in order to make a preliminary estimate of forest area. Next, a total of 32,804 of these points were stereoclassified as to forest type, stand-size class, and density. Finally, a total of 4,579 points were examined on the ground to correct the preliminary area estimate for errors in classification and for actual changes in land use since the photos were taken.

Land class	Photo points		Ground plots visited
	Classified	Stereoclassified	
Forest land	32,502	32,502	2,617
Unproductive forest land	0	0	0
Nonforest land			
with trees	840	68	68
without trees	20,748	0	1,699
water	2,058	0	159
Questionable	234	234	36
Total	56,382	32,804	4,579

At each of forest ground plot location, variable-radius plots (basal area factor 37.5) were established at 10 points uniformly placed over the sample acre. Tree measurements made at these locations and at 293 plots established in 1966 and remeasured in 1980 were the basis for estimates of timber volume, growth, mortality, number of trees, and other forest classifications on land other than National Forest land. Estimates for National Forest land were based on 270 plots established in 1976-1977 by National Forest personnel on commercial forest land on the Huron and Manistee.

2. Growth and mortality on all commercial forest land were estimated using the Stand and Tree Evaluation and Modeling System (STEMS)[3] after the System was adjusted with factors derived from the remeasurement in 1979 of permanent sample plots in the Northern Lower Peninsula that were initially established in 1965. STEMS is an individual tree-growth projection system that uses the following stand and tree characteristics to "grow" trees by updating tree diameter and tree status (live, dead, or cut): species, tree diameter, crown ratio, site index, basal area, and average stand diameter. These characteristics were used to produce growth and mortality rates that were adjusted based on ground conditions gained from remeasurement of plots and applied to trees on the tree list to yield an updated tree list. Local volume equations were applied to the original and updated tree lists to estimate volumes of growth and mortality.

3. The Huron and Manistee National Forests provided estimates of commercial forest area by forest type, stand-size class and stand density from the 1976-1977 National Forest Surveys and estimates of annual growing-stock removals since the last survey. These data were updated with STEMS to provide estimates of 1979 net annual growth and removals and 1980 volume for the Forests. National Forest personnel reviewed STEMS projections.

4. Statistics on timber utilization during 1978 were obtained from mill surveys. The Michigan Department of Natural Resources canvassed resident sawmills, veneer mills, and other primary wood-using plants. The North Central Forest Experiment Station canvassed out-of-State sawmills, pulpmills, and veneer mills to determine their use of Michigan timber. Fuelwood and fencepost output was based on a sample of public and private landowners to determine their production of fuelwood and fenceposts, and on a canvass of industrial and public timber owners. Estimates of primary mill residue used for fuelwood were obtained from the canvass of Michigan primary wood-using plants. Timber cut for products by ownership class was determined by a canvass of public and industrial timber owners. The portion of timber cut unaccounted for by the latter owners was grouped under "farmer and other owners".

[3]*For more information on STEMS, see: Belcher, D. L.; Holdaway, M. R.; Brand, G. J. A Description of STEMS: The stand and tree evaluation and modeling System. Gen. Tech. Rep. NC-79. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; (In prep.) p.*

5. A total of 2,239 felled trees on 123 active logging operations were measured throughout the State during 1977-1978 to develop wood utilization factors for converting timber products output to timber removals for saw logs and pulpwood. Factors for all other products were obtained during the 1964-1965 Michigan utilization study.

6. Field data were sent to St. Paul for compilation.

COMPARING MICHIGAN'S FOURTH INVENTORY WITH THE THIRD INVENTORY

Data from new forest inventories are often compared with data from earlier inventories to determine trends in forest resources. Changes in procedures and definitions between surveys make it necessary to adjust earlier survey data so that they are comparable to data from the new survey. A consistency check was made for each Forest Survey Unit in Michigan to ensure that the changes observed between inventories reflect actual changes in the resource and not changes in definitions or procedures.

Identifying and Correcting Definitional or Procedural Changes

In Michigan's Northern Lower Peninsula Unit, changes between the 1966 and 1980 inventories included definitional changes in the ownership classes and productive-reserved forest land and procedural changes in determining the area of nonforest land by land class, the number of trees by 2-inch diameter class, and the volume equations.

In 1966, State Forest was a separate ownership class and included only land on State Forests. Other forested State-owned land was included under the Other Public ownership class. In 1980, the State ownership class included all State land. However, there is little State-owned commercial forest land outside the State Forest areas in the Northern Lower Peninsula, and general comparisons may be made between the 1966 and 1980 State estimates.

In 1966, some mining companies were called diversified forest industry and classed under Forest Industry. In 1980 these companies were classed under Miscellaneous Private Corporation. Therefore, to

compare statistics for Forest Industry owner between 1966 and 1980 the reader must combine Forest Industry and Miscellaneous Private Corporation ownerships in 1980.

During the 1966 Forest Inventory, Christmas tree plantations were classified as commercial forest land, but they are now classified as productive-reserved forest land. The 1966 commercial forest and productive-reserved areas were adjusted so that they are comparable to 1980 estimates.

In the 1966 Forest Inventory, the 1964 Census of Agriculture estimates of cropland and pasture and rangeland areas were used in our inventory report tables. The 1980 inventory estimates of cropland and pasture and rangeland came from aerial photointerpretation done by Resources Evaluation personnel. The published 1966 estimates of cropland and pasture and rangeland areas were adjusted to be compatible with 1980 estimates.

The procedures used to determine the number of growing-stock trees by species group and 2-inch diameter class improved between the 1966 and 1980 forest inventories. The procedure used in 1966 overestimated the number of growing-stock trees, especially in the lower diameter classes. The 1966 estimates were adjusted so that differences between 1966 and 1980 represent actual changes in the resource, not changes in procedures. Additional adjustments were made in the 1966 number of growing-stock trees to reflect the transfer of Christmas tree plantations to productive-reserved forest land.

The volume equations used in 1980 gave more accurate estimates of tree volume than those used in 1966. Therefore, the 1966 volumes were adjusted by factors derived from the 1980 volume equations to make them comparable to 1980 volumes.

Running a Consistency Check

The Timber Resource Analysis System (TRAS) was used to ensure that it was possible to move from the adjusted 1966 resource statistics to the 1980 values. TRAS is a Forest Service computer program for updating, backdating, and projecting timber volume, growth, mortality, and removals. Using the adjusted 1966 numbers of softwood and hardwood trees by 2-inch diameter class and applying 1980 cubic feet per tree TRAS generated estimates of 1966 softwood and hardwood volumes that are comparable with 1980 volumes. Then, using growth rates, mortality rates, and removals rates for the period between the two surveys, TRAS moved from 1966 to 1980. The program printed out volumes by diameter class and softwoods and hardwoods for each year in the period. Thus, inconsistencies in volume, growth, mortality, and removals could be identified and resolved.

TRAS generated an estimate of what total removals had to be in order for the inventory to have changed as it did between surveys, given the volume, growth, and mortality inputs. Estimates for removals for products and for logging residues—two of the three components of total timber removals—were available from an independent utilization study. "Other" removals (see Definition of Terms in Appendix), the third component of total removals, were estimated by subtracting the first two removals components from the TRAS-generated total removals estimate. This estimate of "other" removals was compared with findings from remeasurement plots and new plots (stump counts and land use change) to check its validity. When necessary, TRAS was rerun and adjusted until other removals were compatible with the estimate from field data. Total removals are "trend level removals" because the estimate of "other" removals was based on a removals trend line from 1966 to 1980.

LOG GRADE

In Michigan's Northern Lower Peninsula the butt log of every sawtimber tree on every full permanent sample plot was graded for quality. Additionally, all of the logs in a smaller sample of trees throughout the State were graded. The volume yield by log grade for each tree in the latter sample was used to distribute the volume of trees in the former sample into log-grade classes. The resulting volumes by log-grade classes were expanded to provide an estimate for the entire Unit.

Logs were graded on the basis of external characteristics as indicators of quality. Hardwood species were graded according to "Hardwood Log Grades for Standard Lumber".[4] The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards, was graded as follows:

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[4]*Vaughn, C. L.; Wollin, C. A.; McDonald, K. A.; and Bulgrin, E. H. Hardwood log grades for standard lumber. Res. Pap. FPL 63. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory; 1966. 52 p.*

Forest Service standard grades for hardwood factory saw logs

Grading factors		Specifications							
		Log grade 1			Log grade 2				Log grade 3
Position in tree		Butts only	Butts and uppers		Butts and uppers				Butts and uppers
Scaling diameter, inches		[1]13-15	16-19	20+	[2]11+		12+		8+
Length without trim, feet			10+		10+	8-9	10-11	12+	8+
Required clear cuttings[3] of each of three best faces[4]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No Limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	3/4	3/4	2/3	2/3	1/2
Maximum sweep and crook allowance	For logs with less than one-fourth of end in sound defects		15 percent			30 percent			50 percent
	For logs with more than one-fourth of end in sound defects		10 percent			20 percent			35 percent
Maximum scaling deduction			40 percent[5]			50 percent[6]			50 percent

[1]Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.
[2]Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.
[3]A clear cutting is a portion of a face, extending the width of the face, that is free of defects.
[4]A face is one-fourth of the surface of the log as divided lengthwise.
[5]Otherwise #1 logs with 41-60 percent deductions can be #2.
[6]Otherwise #2 logs with 51-60 percent deductions can be #3.

Forest Service standard specifications for hardwood construction logs (tie and timber logs)[1]

Position in tree		Butt and upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements
Sweep allowance, absolute		One-fourth of the diameter at the small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over one-third of the log diameter at point of occurrence, and none extends more than 3 inches into included timber.[2]
Unsound surface defects		Same requirements as for sound defects if they extend into included timber.[2] No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit one shake not to exceed one-fourth the scaling diameter and will admit a longitudinal split not extending more than 5 inches into the contained timber.

[1]These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, then it may be necessary to subdivide the class into grades.

[2]Included timber is always square, and dimension is judged from small end.

Softwood species were graded according to the following specifications on the next page.

Log Grades for Eastern White Pine

Log grade	Minimum size Diameter	Minimum size Length[1]	Sweep or crook allowance	Total cull allowance including sweep	Maximum weevil injury	Allowable knot size (inches)[2] on three best faces or minimum clearness on four faces
	Inches	*Feet*	*Percent*		*Number*	*Inches*
1	12 & 13	8-16	20	50	0	Four faces clear full length
	14 +	10-16	20	50	0	Two faces clear full length, or four faces clear 50 percent length (6 foot min. length)[3]
2	6 +	8-16	30	50	0	Sound knots 1.e[4] D/6 and less than 3 inches.[5] Unsound knots: 1.e. 1½ inches and for: butt, lots 1.e. D/12, upper logs 1.e. D/10, or four faces clear 50 percent of length
3	6 +	8-16	40	50	8-foot logs 1 weevil 10-foot + logs: 2 weevils	Sound knots 1.e.D/3 and less than 5 inches Unsound knots 1.e. D/6 and less than 2½ inches.
4	6 +	8-16	50	50	No limit	No limit

[1]Plus trim.
[2]Disregard all knots less than inch diameter in all grades.
[3]The sum of the diameter of sound knots plus twice the sum of the diameter of unsound knots (in inches) is less than or equal to half of the diameter of the log (inches).
[4]1.e. means less than or equal to.
[5]D means d.i.b. of log at location of knot.

Log Grades for Jack Pine and Red Pine

Grade 1: logs with three or four clear faces.[5]

Grade 2: logs with one or two clear faces.

Grade 3: logs with no clear faces.

After the tentative log grade is established, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3. Net scale after deduction for defect must be at least 50 percent of the gross contents of the log.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one third the diameter inside bark at small end.

2. *Heart rot.* Degrade any tentative 1 or 2 log grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

[5]*A face is one fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than ½-inch in diameter, overgrown knots of any size, holes more than ¼-inch in diameter. Faces may be rotated to obtain the maximum number of clear ones.*

Log Grades For All Other Softwood Logs

Grade 1

1. Logs must be 16 inches in diameter or larger, 10 feet in length or longer, and have not more than 30 percent of gross scale deducted for defect.
2. Logs must be at least 75 percent clear on each of three faces.
3. All knots outside clear cutting must be sound and not more than 2-inches in size.

Grade 2

1. Logs must be 12 inches in diameter or larger, 10 feet in length or longer, and have a net scale of at least 50 percent of the gross contents of the log after deduction for defect.
2. Logs must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Logs must be 6 inches in diameter or larger, 8 feet in length or longer, and have a net scale of at least 50 percent of the gross contents of the log after deduction for defect.

Note: (A) Diameters are diameter inside bark (d.i.b.) at small end of log.
(B) Percent clear refers to percent clear in one continuous section.

TREE SPECIES GROUPS IN MICHIGAN'S SOUTHERN LOWER PENINSULA UNIT[6]

SOFTWOODS
- Eastern white pine ..... *Pinus strobus*
- Red pine ..... *Pinus resinosa*
- Jack pine ..... *Pinus banksiana*
- White spruce ..... *Picea glauca*
- Black spruce ..... *Picea mariana*
- Balsam fir ..... *Abies balsamea*
- Eastern hemlock ..... *Tsuga canadensis*
- Tamarack ..... *Larix laricina*
- Northern white-cedar ..... *Thuja occidentalis*

OTHER SOFTWOODS
- Eastern redcedar ..... *Juniperus virginiana*
- Norway spruce ..... *Picea abies*
- Austrian pine ..... *Pinus nigra*
- Scotch pine ..... *Pinus sylvestris*

HARDWOODS
- White oaks
  - White oak ..... *Quercus alba*
  - Swamp white oak ..... *Quercus bicolor*
  - Bur oak. ..... *Quercus macrocarpa*
  - Chestnut oak ..... *Quercus prinus*
- Select red oak
  - Northern red oak ..... *Quercus rubra*
- Other red oak
  - Scarlet oak ..... *Quercus coccinea*
  - Northern pin oak ..... *Quercus ellipsoidalis*
  - Pin oak ..... *Quercus palustris*
  - Black oak ..... *Quercus velutina*
- Hickories
  - Bitternut hickory ..... *Carya cordiformis*
  - Pignut hickory ..... *Carya glabra*
  - Shellbark hickory ..... *Carya laciniosa*
  - Shagbark hickory ..... *Carya ovata*
  - Mockernut hickory ..... *Carya tomentosa*
  - Yellow birch ..... *Betula alleghaniensis*
- Hard maples
  - Sugar maple ..... *Acer saccharum*
  - Black maple ..... *Acer nigrum*
- Soft maples
  - Red maple ..... *Acer rubrum*
  - Silver maple ..... *Acer saccharinum*
  - American beech ..... *Fagus grandifolia*
- Ashes
  - White ash ..... *Fraxinus americana*
  - Black ash ..... *Fraxinus nigra*
  - Green ash ..... *Fraxinus pennsylvanica*
- Balsam poplar ..... *Populus balsamifera*
- Eastern Cottonwood ..... *Populus deltoides*
- Aspens
  - Bigtooth aspen ..... *Populus grandidentata*
  - Quaking aspen ..... *Populus tremuloides*
- Basswood ..... *Tilia americana*
- Yellow poplar ..... *Liriodendron tulipifera*
- Black walnut ..... *Juglans nigra*
- Black cherry ..... *Prunus serotina*
- Butternut ..... *Juglans cinerea*
- Elms
  - American elm ..... *Ulmus americana*
  - Slippery elm ..... *Ulmus rubra*
  - Rock elm ..... *Ulmus thomassii*
- Paper birch ..... *Betula papyrifera*

OTHER HARDWOODS
- Boxelder ..... *Acer negundo*
- River birch ..... *Betula nigra*
- Black willow ..... *Salix nigra*
- Ohio buckeye ..... *Aesculus glabra*
- Flowering dogwood ..... *Cornus florida*
- Honey locust ..... *Gleditsia triacanthos*
- Osage-orange ..... *Maclura pomifera*
- Black tupelo ..... *Nyssa sylvatica* var. *sylvatica*
- Sycamore ..... *Platanus occidentalis*
- Black locust ..... *Robinia psuedoacacia*
- Sassafras ..... *Sassafras albidum*

[6]*The common and scientific names are based on, Little, Elbert L. Check list of native and naturalized trees of the United States. Agric. Handbk. 541. Washington, D.C.: U.S. Department of Agriculture, Forest Service, 1979. 375 p.*

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1,000 board feet (International ¼-inch log rule) = 3.48 cubic meters.
Breast height = 1.4 meters above the ground.1 cubic foot = 0.0283 cubic meter.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
1 pound = 0.454 kilogram.
1 ton = 0.907 metric ton.

DEFINITION OF TERMS

Acceptable trees.—Growing-stock trees of commercial species that meet specified standards of size and quality but do not qualify as desirable trees.

Area-condition classes.—*Class 10.*—Areas fully stocked with desirable trees but not overstocked.

Class 20.—Areas fully stocked with desirable trees but overstocked with all live trees.

Class 30.—Areas medium to fully stocked with desirable trees and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 40.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.

Class 50.—Areas poorly stocked with desirable trees but fully stocked with growing-stock trees.

Class 60.—Areas poorly stocked with desirable trees but with medium to full stocking of growing-stock trees.

Class 70.—Areas poorly stocked with desirable trees and poorly stocked with growing-stock trees.

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The above-ground volume of all live trees (including bark and foliage) reported in green tons. Biomass is made up of 5 components:

Growing-stock bole.—Biomass of a growing-stock tree from a 1-foot stump to a variable 4-inch top.

Growing-stock tops and limbs.—Biomass of a growing-stock tree from a 1-foot stump minus the growing-stock bole.

Cull bole.—Biomass of a cull tree from a 1-foot stump to a variable 4-inch top.

Cull tops and limbs.—Biomass of a cull tree from a 1-inch stump minus the cull bole.

1- to 5-inch trees.—Biomass of all live trees 1- to 5-inches in diameter at breast height.

Commercial forest land.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as commercial forest land have the capability of producing in excess of 20 cubic feet per acre per year of annual growth under management. Currently inaccessible and inoperable areas are included, except when the areas involved are small and unlikely to become suitable for production of industrial wood in the foreseeable future.) Also see definition of pastured commercial forest land.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam and hawthorn.)

County and municipal land.—Lands owned by counties and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Cull.—Portions of a tree that are unusable for industrial wood products, because of rot, form, or other defect.

Desirable trees.—Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest managers in silvicultural operations.

Diameter classes.—A classification of trees based on diameter outside bark, measured at breast height (4- feet above the ground). (Note: d.b.h. is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h. inclusive).

Farm.—Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totals $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for a year amounts to at least $250. Places having less than the $50 or $250 minimum estimated sales in a given year are also counted as farms if they can normally be expected to produce goods in sufficient quantity to meet the requirements of the definition.

Farmer-owned land.—Land owned by farm operators. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparison of basal area and/or number of trees,

by age or size and spacing with specified standards.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. Also see definitions for land area, commercial forest land, noncommercial forest land, productive-reserved forest land, stocking, unproductive forest land, and water.

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest trees.—Woody plants having a well-developed stem and usually more than 12 feet in height at maturity.

Forest type.—A classification of forest land based upon the species forming a plurality of live tree stocking. Major forest types in Michigan are:

Jack pine.—Forests in which jack pine comprises a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and maple.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and maple.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir and white spruce comprise a plurality of stocking with balsam fir the most common. (Common associates include white spruce, aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce and balsam fir comprise a plurality of the stocking with white spruce the most common. (Common associates include balsam fir, aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers comprise a plurality of the stocking with black spruce the most common. (Common associates include tamarack and northern white-cedar.)

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of the stocking with northern white-cedar the most common. (Common associates include tamarack and black spruce.)

Tamarack.—Forests in which swamp conifers comprise a plurality of the stocking with tamarack the most common. (Common associates include black spruce and northern white-cedar.)

Oak-hickory.—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include jack pine, beech, yellow-poplar, elm, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, cottonwood, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include birches, spruce, and balsam fir.)

Maple-birch.—Forests in which sugar maple, basswood, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine, elm, hemlock, and basswood.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include balsam poplar, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprises a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Exotic.—Forests in which species not native to Michigan comprise a plurality of the stocking. (Mostly scotch pine plantations.)

Gross area.—The entire area of land and water as determined by the Bureau of the Census, 1970.

Growing-stock trees.—Live trees of commercial species qualifying as desirable and acceptable trees. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from a 1-foot stump to a minimum 4.0 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to cords by multiplying by 79 cubic feet per solid wood cord.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Idle farmland.—Includes former croplands, orchards, improved pastures, and farm sites not tended within the past 2 years and presently less than 16.7 percent stocked with trees.

Improved pasture.—Land currently improved for grazing, by cultivation, seeding, irrigation, or

clearing of trees or brush and less than 16.7 percent stocked with live trees.

Indian land.—Tribal lands held in fee but administered by the Federal Government.

Land area.—A. *Bureau of the Census.* The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. *Forest Survey.* The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

Live trees.—Growing-stock, rough and rotten trees 1 inch d.b.h. and larger.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

Logging residues.—The unused growing stock portions of trees cut or killed by logging.

Maintained road.—Any road, hard-topped or other surfaces, that is plowed or graded at least once a year. Includes rights-of-way that are cut or treated to limit herbaceous growth.

Marsh.—Nonforest land that characteristically supportslow, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw log section that meets pulpwood or saw log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest, and land administered by the Bureau of Land Management.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land.

Mortality.—The volume of sound wood in growing-stock and sawtimber trees that die annually.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land under the administration of the USDA Forest Service.

Net annual growth of growing-stock.— The annual change in volume of sound wood in live-sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.—(a) Unproductive forest land and (b) productive-reserved forest land.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area, to qualify as nonforest land.)

a. *Nonforest land without trees.*—Nonforest land with no live trees present.

b. *Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other removals.—Growing-stock trees removed but not utilized for products, or trees left standing but "removed" from the commercial forest land classification by land use change. Examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Ownership.—Property owned by one owner, regardless of the number of parcels in a specified area.

Ownership size class.—The amount of commercial forest land owned by one owner, regardless of the number or parcels.

Owner tenure.—The length of time a property has been held by the owner.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. Physiographic classes used in Resources Evaluation inventories are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: sandy jack pine plains.

Xeromesic sites.—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate.

Hydromesic sites.—Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: better drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: wet, frequently flooded river bottoms and spruce bogs.

Plant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stands.—(See stand-size class.)

Poletimber trees.—Growing-stock trees of commercial species at least 5.0 inches d.b.h., but smaller than sawtimber size.

Productive-reserved forest land.—Forest land sufficiently productive to qualify as commercial forest land but withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs and bolts; cooperage logs and bolts; pulpwood; fuelwood; piling; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead trees.—Standing or down dead trees that are considered merchantable by Regional standards.

Saplings.—Live trees 1.0 to 5.0 inches d.b.h.

Sapling-seedling stands.—(See stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7 inches (9 inches for hardwoods) or other combinations of size and defect specified by Regional standards.

Saw log portion.—That part of the bole of sawtimber trees between the stump and the saw log top.

Saw log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stands.—(See stand-size class.)

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw log portion of live sawtimber in board feet, International inch rule, from stump to a minimum 7 inches

top diameter outside bark (d.o.b.) for softwoods and a minimum 9 inches top d.o.b. for hardwoods.

Seedlings.—Live trees less than 1.0 inch d.b.h. that areexpected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—Sawtimber-size trees of commercial species that contain at least one merchantable 8-to 11-foot saw log but not a 12-foot saw log.

Shrub biomass.—The total above-ground weight (including the bark) of selected shrubs and trees less than 1 inch d.b.h.

Site class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

and.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-area class.—The extent of a continuous forested area of the same forest type, stand-size class, and stand-density class.

Stand-size class.—A classification of forest land based on the size class of growing-stock trees on the area; that is, sawtimber, poletimber or seedlings and saplings.

a. *Sawtimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. *Poletimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

c. *Sapling-seedling stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

d. *Nonstocked stands.*—Stands in which stocking of growing-stock trees is less than 16.7 percent.

State land.—Land owned by States, or land leased to these governmental units for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of trees is 134.0 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 101.0 to 133.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 61.0 to 100.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 60.9 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Timber removals from growing stock.—The volume of sound wood in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other removals.

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-

stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Tree biomass.—The total aboveground weight (including the bark) of all trees 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark) from a 1-foot stump for trees more than 5 inches in diameter.

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Unproductive forest land.—Forest land incapable of producing 20 cubic feet per acre of annual growth or of yielding crops of industrial wood under natural conditions because of adverse site conditions. (Note: Adverse conditions include shallow soils, dry climate, poor drainage, high elevation, steepness, and rockiness.

Upper stem portion.—That part of the bole of sawtimber trees above the saw log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities andtowns; suburban areas developed for residential, industrial, or recreational purposes; schoolyards, cemeteries, roads; railroads; airports; beaches; powerlines; and other rights-of-way; or other nonforest land not included in any other specified land use class.

Water.—(a) *Bureau of the Census.*—Streams, sloughs, estuaries, and canals more than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds more than 40 acres in area.

(b) *Noncensus.*—The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for commercial forest land except that it is less than 120 feet wide.

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Table 1.--Area of land by land class, Northern Lower Peninsula, Michigan, 1966[1/] and 1980

(In thousand acres)

Land class	1966[1/]	1980
FOREST LAND		
Commercial forest		
Jack pine	467.1	506.7
Red pine	325.1	427.0
White pine	36.7	75.2
Balsam fir-white spruce	183.7	73.3
Black spruce	29.4	28.0
Northern white-cedar	333.8	355.5
Tamarack	35.9	30.6
Oak-hickory	1,252.0	1,068.1
Elm-ash-soft maple	604.4	416.3
Maple-birch	1,291.6	1,662.4
Aspen	1,998.6	1,817.5
Paper birch	174.0	113.9
Exotic	54.0	57.2
Nonstocked	168.8	63.2
Subtotal	6,955.1	6,694.9
Noncommercial forest land		
Unproductive	34.5	87.7
Productive-reserved	62.1	147.0
Subtotal	96.6	234.7
Total	7,051.7	6,929.6
NONFOREST LAND		
Cropland	1,956.8	2,603.2
Pasture and range	929.1	754.8
Other	1,449.8	1,063.1
Total	4,335.7	4,421.1
TOTAL LAND	[2/]11,387.4	[3/]11,350.7
WATER (BUREAU OF THE CENSUS)	[2/]325.9	[3/]362.6
TOTAL LAND AND WATER	[2/]11,713.3	[3/]11,713.3

[1/]Figures have been adjusted from those published after the 1966 survey to conform to 1980 areas because of changes in survey procedures and definitions.

[2/]U.S. Department of Commerce, Bureau of Census. 1950.

[3/]U.S. Department of Commerce, Bureau of Census, 1970. Area Measurement Reports, GE-20, No. 1.

Table 2.--Area of land by land use class and county,
Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Land use class	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
FOREST LAND												
Commercial forest	6,694.9	306.5	217.7	156.6	92.7	17.8	121.1	138.6	366.6	215.7	272.9	195.2
Unproductive forest	87.7	10.4	3.2	--	1.7	--	--	--	15.3	4.2	0.3	--
Productive reserved	147.0	2.0	1.7	3.3	--	2.3	9.9	0.5	1.1	--	31.6	7.0
Total	6,929.6	318.9	222.6	159.9	94.4	20.1	131.0	139.1	383.0	219.9	304.8	202.2
NONFOREST LAND												
Nonforest with trees												
Cropland with trees	46.7	--	--	2.5	--	4.5	--	--	--	2.3	--	2.5
Improved pasture with trees	62.3	4.5	4.6	--	--	--	--	--	--	2.3	--	--
Wooded strips	33.8	2.3	--	4.7	--	--	--	9.6	5.1	--	--	--
Idle farmland with trees	2.3	--	--	--	--	--	--	--	--	--	--	--
Marsh with trees	97.8	--	2.5	--	2.3	--	2.5	2.2	--	11.8	--	--
Urban and other windbreaks	--	--	--	--	--	--	--	--	--	--	--	--
Windbreaks	7.5	--	--	--	--	--	--	--	--	--	--	--
Wooded pasture	2.2	--	--	--	--	--	--	--	--	--	--	2.2
Subtotal	252.6	6.8	7.1	7.2	2.3	4.5	2.5	11.8	5.1	16.4	--	4.7
Nonforest without trees												
Cropland without trees	2,384.1	56.7	87.7	95.6	99.2	181.3	34.8	65.5	49.0	69.0	15.2	63.3
Improved pasture without trees	692.5	23.2	18.6	--	2.3	--	13.9	--	--	27.9	20.9	--
Idle farm without trees	2.5	--	--	--	--	--	--	--	--	--	--	--
Marsh without trees	166.7	16.4	4.8	--	5.4	7.0	4.6	2.3	3.9	11.8	2.3	--
Other farm-farmstead	172.4	2.3	--	2.3	--	4.6	5.8	2.3	--	4.6	2.3	4.1
Urban and other	727.6	9.3	20.4	39.3	31.6	67.1	9.3	44.1	20.2	15.8	13.8	20.5
Noncensus water	22.7	--	--	--	--	1.6	--	--	--	--	--	--
Subtotal	4,168.5	107.9	131.5	137.2	138.5	261.6	68.4	114.2	73.1	129.1	54.5	87.9
Total	4,421.1	114.7	138.6	144.4	140.8	266.1	70.9	126.0	78.2	145.5	54.5	92.6
TOTAL LAND	[1/]11,350.7	433.6	361.3	304.3	235.2	286.2	201.9	265.1	461.2	365.4	359.3	294.7
WATER (BUREAU OF THE CENSUS)	[1/]362.6	10.6	16.3	28.5	1.0	2.4	17.0	23.6	49.5	3.9	2.9	10.6
TOTAL LAND AND WATER	[1/]11,713.3	444.2	377.6	332.8	236.2	288.6	218.9	288.7	510.7	369.3	362.2	305.3

(Table 2 continued on next page)

[1/]U.S. Department of Commerce, Bureau of the Census, 1970. Area Measurement Reports, GE-20, No. 1.

(Table 2 continued)

Land use class	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
FOREST LAND												
Commercial forest	192.8	152.2	224.6	78.4	253.3	299.8	75.8	225.5	148.0	122.7	147.5	204.4
Unproductive forest	--	--	7.1	--	2.5	0.2	--	--	0.1	2.5	2.3	2.3
Productive reserved	0.3	2.2	0.2	--	19.5	--	18.3	0.2	7.9	--	--	5.8
Total	193.1	154.4	231.9	78.4	275.3	300.0	94.1	225.7	156.0	125.2	149.8	212.5
NONFOREST LAND												
Nonforest with trees												
Cropland with trees	--	2.3	2.3	2.3	2.3	--	--	--	--	4.8	--	4.6
Improved pasture with trees	--	2.3	2.3	7.2	2.3	2.3	2.3	--	2.3	6.8	--	2.3
Wooded strips	--	--	--	--	2.5	--	--	--	--	--	--	4.0
Idle farmland with trees	--	--	2.3	--	--	--	--	--	--	--	--	--
Marsh with trees	10.9	--	--	6.8	--	--	--	4.7	--	--	--	10.5
Urban and other windbreaks	--	--	--	--	--	--	--	--	--	--	--	--
Windbreaks	--	--	--	--	2.5	--	--	--	--	--	--	--
Wooded pasture	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	10.9	4.6	6.9	16.3	9.6	2.3	2.3	4.7	2.3	11.6	--	21.4
Nonforest without trees												
Cropland without trees	62.7	65.0	36.8	189.6	56.5	23.2	68.8	74.3	119.2	139.3	111.5	70.2
Improved pasture without trees	39.5	29.0	25.8	42.7	--	30.2	23.6	4.6	13.9	47.3	18.6	23.2
Idle farm without trees	--	--	--	--	--	--	--	--	--	2.5	--	--
Marsh without trees	2.3	2.3	2.3	2.3	--	--	.0	6.8	--	6.9	4.6	13.8
Other farm-farmstead	2.3	7.0	14.1	4.6	4.6	2.3	7.8	10.0	11.1	4.6	18.6	9.3
Urban and other	11.4	33.5	28.5	30.4	12.2	7.3	23.9	27.8	9.3	21.0	29.6	9.3
Noncensus water	--	--	1.6	1.6	3.8	--	--	--	1.6	--	--	1.6
Subtotal	118.2	136.8	109.1	271.2	77.1	63.0	124.1	123.5	155.1	221.6	182.9	127.4
Total	129.1	141.4	116.0	287.5	86.7	65.3	126.4	128.2	157.4	233.2	182.9	148.8
TOTAL LAND	322.2	295.8	347.9	365.9	362.0	365.3	220.5	353.9	313.4	358.4	332.7	361.3
WATER (BUREAU OF THE CENSUS)	5.5	17.8	12.4	0.8	4.7	4.0	18.9	9.6	9.8	6.4	2.0	4.8
TOTAL LAND AND WATER	327.7	313.6	360.3	366.7	366.7	369.3	239.4	363.5	323.2	364.8	334.7	366.1

(Table 2 continued on next page)

(Table 2 continued)

Land use class	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
FOREST LAND										
Commercial forest	302.0	310.0	148.3	219.5	156.8	307.2	260.8	266.9	246.7	250.3
Unproductive forest	--	4.3	5.1	9.4	--	2.7	--	7.7	6.0	0.4
Productive reserved	0.3	2.0	6.6	6.4	1.7	--	2.1	3.0	0.1	11.0
Total	302.3	316.3	160.0	235.3	158.5	309.9	262.9	277.6	252.8	261.7
NONFOREST LAND										
Nonforest with trees										
Cropland with trees	--	2.3	7.1	--	2.4	2.2	--	--	--	2.3
Improved pasture with trees	--	2.4	2.4	4.6	2.3	2.2	--	--	--	6.9
Wooded strips	--	--	3.4	--	--	--	--	2.2	--	--
Idle farmland with trees	--	--	--	--	--	--	--	--	--	--
Marsh with trees	--	4.4	3.3	2.3	12.4	--	--	6.8	11.1	3.3
Urban and other windbreaks	--	--	--	--	--	--	--	--	--	--
Windbreaks	--	2.6	2.4	--	--	--	--	--	--	--
Wooded pasture	--	--	--	--	--	--	--	--	--	--
Subtotal	--	11.7	18.6	6.9	17.1	4.4	--	9.0	11.1	12.5
Nonforest without trees										
Cropland without trees	15.9	111.2	98.9	46.5	106.8	18.6	30.2	74.3	4.6	42.7
Improved pasture without trees	12.2	67.1	37.2	25.3	46.5	13.9	25.2	14.1	21.0	24.8
Idle farm without trees	--	--	--	--	--	--	--	--	--	--
Marsh without trees	6.2	5.0	--	16.5	4.6	2.3	4.6	7.0	18.4	2.3
Other farm-farmstead	2.3	7.0	10.8	4.6	9.3	2.3	--	4.6	2.3	4.6
Urban and other	16.3	23.4	17.7	23.3	29.0	7.2	14.6	28.0	23.2	9.3
Noncensus water	--	2.0	--	7.3	--	1.6	--	--	--	--
Subtotal	52.9	215.7	164.6	123.5	196.2	45.9	74.6	128.0	69.5	83.7
Total	52.9	227.4	183.2	130.4	213.3	50.3	74.6	137.0	80.6	96.2
TOTAL LAND	355.2	543.7	343.2	365.7	371.8	360.2	337.5	414.6	333.4	357.9
WATER (BUREAU OF THE CENSUS)	7.7	11.2	3.0	5.5	2.6	3.3	6.8	19.3	33.3	6.9
TOTAL LAND AND WATER	362.9	554.9	346.2	371.2	374.4	363.5	344.3	433.9	366.7	364.8

Table 3.--Area of commercial forest land by ownership class and county, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
National Forest	859.5	103.1	--	--	--	--	--	--	--	--	41.0	--
Bureau of Land Mgmt.	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous federal	15.1	--	--	--	--	--	--	--	--	--	--	--
Indian	--	--	--	--	--	--	--	--	--	--	--	--
State	1,825.1	2.0	26.9	39.6	25.2	--	59.3	47.6	186.2	52.9	127.1	78.3
County and municipal	37.6	--	2.5	--	--	--	--	2.2	--	2.2	--	2.5
Forest industry	76.0	--	--	--	--	--	5.0	--	11.9	--	2.3	--
Farmer	1,274.5	27.5	33.2	19.0	14.9	8.9	17.2	51.6	152.5	49.3	7.6	90.7
Misc. private-corp.	474.0	61.9	33.6	12.2	4.5	--	4.5	7.2	--	29.4	13.3	2.2
Misc. private-indiv.	2,133.1	112.0	121.5	85.8	48.1	8.9	35.1	30.0	16.0	81.9	81.6	21.5
All owners	6,694.9	306.5	217.7	156.6	92.7	17.8	121.1	138.6	366.6	215.7	272.9	195.2

(Table 3 continued)

(Table 3 continued)

Ownership class	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
National Forest	--	--	96.6	--	--	108.1	--	64.5	51.1	2.4	--	--
Bureau of Land Mgmt.	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous federal	--	--	2.7	--	--	2.5	--	5.8	--	--	--	--
Indian	--	--	--	--	--	--	--	--	--	--	--	--
State	72.9	66.5	16.5	2.3	144.2	57.1	4.7	15.4	5.4	21.8	34.8	89.3
County and municipal	5.0	2.5	--	--	--	--	--	4.2	2.7	2.5	2.7	--
Forest industry	--	1.7	9.9	--	--	--	--	4.6	13.0	2.3	2.3	4.5
Farmer	23.2	30.1	18.7	20.4	52.3	20.6	32.5	63.1	27.9	55.2	8.9	23.2
Misc. private-corp.	2.5	7.7	16.5	4.3	21.3	11.9	6.9	26.4	9.7	7.4	6.2	9.7
Misc. private-indiv.	89.2	43.7	63.7	51.4	35.5	99.6	31.7	41.5	38.2	31.1	92.6	77.7
All owners	192.8	152.2	224.6	78.4	253.3	299.8	75.8	225.5	148.0	122.7	147.5	204.4

(Table 3 continued on next page)

(Table 3 continued)

Ownership class	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
National Forest	--	101.2	45.7	19.4	--	136.6	--	--	--	89.8
Bureau of Land Mgmt.	--	--	--	--	--	--	--	--	--	--
Miscellaneous federal	4.1	--	--	--	--	--	--	--	--	--
Indian	--	--	--	--	--	--	--	--	--	--
State	151.0	2.7	--	61.3	23.6	44.0	95.6	64.9	161.0	45.0
County and municipal	--	--	2.0	2.3	2.3	--	--	2.0	--	--
Forest industry	--	--	--	--	2.3	--	--	16.2	--	--
Farmer	127.6	38.5	39.3	8.9	32.1	4.7	29.1	90.2	--	55.6
Misc. private-corp.	7.1	20.2	11.7	9.9	9.1	30.5	20.8	15.1	27.8	22.5
Misc. private-indiv.	12.2	147.4	49.6	117.7	87.4	91.4	115.3	78.5	57.9	37.4
All owners	302.0	310.0	148.3	219.5	156.8	307.2	260.8	266.9	246.7	250.3

Table 4.--Area of commercial forest land by forest type, physiographic class, and ownership class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type and physiographic class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack pine											
Hydric	1.8	--	--	--	--	1.8	--	--	--	--	--
Hydromesic	11.2	--	--	--	--	8.9	--	--	--	--	2.3
Mesic	53.7	9.6	--	--	--	24.1	2.6	--	7.1	5.1	5.2
Xeromesic	404.2	114.4	--	1.8	--	183.0	2.3	--	15.6	11.7	75.4
Xeric	35.8	23.7	--	--	--	7.5	--	--	--	--	4.6
All classes	506.7	147.7	--	1.8	--	225.3	4.9	--	22.7	16.8	87.5
Red pine											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	2.3	--	--	--	--	2.3	--	--	--	--	--
Mesic	133.8	17.4	--	--	--	42.5	1.7	1.7	35.6	9.6	25.3
Xeromesic	290.9	171.1	--	--	--	61.7	--	--	19.4	9.6	29.1
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	427.0	188.5	--	--	--	106.5	1.7	1.7	55.0	19.2	54.4
White pine											
Hydric	3.9	--	--	--	--	1.7	--	--	--	2.2	--
Hydromesic	12.9	--	--	--	--	4.3	--	--	2.5	--	6.1
Mesic	46.4	--	--	--	--	14.0	--	--	11.2	8.6	12.6
Xeromesic	12.0	--	--	--	--	4.4	--	--	--	2.3	5.3
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	75.2	--	--	--	--	24.4	--	--	13.7	13.1	24.0
Balsam fir											
Hydric	1.2	--	--	--	--	1.2	--	--	--	--	--
Hydromesic	31.7	--	--	--	--	4.8	--	--	6.8	6.3	13.8
Mesic	18.5	2.9	--	--	--	2.2	--	--	2.3	6.7	4.4
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	51.4	2.9	--	--	--	8.2	--	--	9.1	13.0	18.2
White spruce											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	9.2	--	--	--	--	2.0	--	--	4.7	--	2.5
Mesic	10.4	--	--	--	--	--	2.5	--	--	--	7.9
Xeromesic	2.3	--	--	--	--	--	--	--	2.3	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	21.9	--	--	--	--	2.0	2.5	--	7.0	--	10.4

(Table 4 continued on next page)

(Table 4 continued)

Forest type and physiographic class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Black spruce											
Hydric	8.2	--	--	--	--	5.7	--	--	--	2.5	--
Hydromesic	18.1	--	--	--	--	8.6	--	--	5.0	--	4.5
Mesic	1.7	--	--	--	--	--	--	--	--	--	1.7
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	28.0	--	--	--	--	14.3	--	--	5.0	2.5	6.2
Northern white-cedar											
Hydric	45.3	6.1	--	--	--	16.0	--	--	9.7	--	13.5
Hydromesic	292.5	15.0	--	--	--	83.0	--	4.5	93.1	13.7	83.2
Mesic	17.7	--	--	--	--	--	--	2.3	5.0	2.3	8.1
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	355.5	21.1	--	--	--	99.0	--	6.8	107.8	16.0	104.8
Tamarack											
Hydric	15.6	--	--	--	--	8.6	--	--	--	2.3	4.7
Hydromesic	15.0	--	--	--	--	2.0	--	--	2.0	--	11.0
Mesic	--	--	--	--	--	--	--	--	--	--	--
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	30.6	--	--	--	--	10.6	--	--	2.0	2.3	15.7
Oak-hickory											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	40.3	6.9	--	--	--	6.8	--	--	7.4	--	19.2
Mesic	640.2	32.0	--	--	--	192.3	5.0	9.7	69.0	60.0	272.2
Xeromesic	373.8	187.1	--	10.8	--	70.4	--	--	14.7	20.7	70.1
Xeric	13.8	11.4	--	--	--	2.4	--	--	--	--	--
All classes	1,068.1	237.4	--	10.8	--	271.9	5.0	9.7	91.1	80.7	361.5
Elm-ash-soft maple											
Hydric	41.9	2.0	--	--	--	15.4	--	2.3	10.9	2.5	8.8
Hydromesic	364.7	18.5	--	--	--	74.3	2.7	11.7	96.9	34.9	125.7
Mesic	9.7	--	--	--	--	2.5	--	--	2.5	--	4.7
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	416.3	20.5	--	--	--	92.2	2.7	14.0	110.3	37.4	139.2

(Table 4 continued on next page)

(Table 4 continued)

Forest type and physiographic class	All owners	Ownership class: National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Maple-birch											
Hydric	7.6	--	--	--	--	--	--	--	2.4	2.5	2.7
Hydromesic	118.3	0.6	--	--	--	12.5	2.0	--	41.9	9.4	51.9
Mesic	1,444.7	67.2	--	--	--	356.9	2.5	12.6	443.3	72.8	489.4
Xeromesic	91.8	6.7	--	--	--	33.6	--	--	11.7	6.9	32.9
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	1,662.4	74.5	--	--	--	403.0	4.5	12.6	499.3	91.6	576.9
Aspen											
Hydric	12.6	--	--	--	--	2.5	--	--	5.9	--	4.2
Hydromesic	392.2	12.0	--	2.5	--	103.7	2.3	2.3	73.3	27.9	168.2
Mesic	1,210.2	71.5	--	--	--	351.6	12.0	20.6	207.7	111.7	435.1
Xeromesic	193.8	73.7	--	--	--	65.8	--	--	7.1	11.5	35.7
Xeric	8.7	8.7	--	--	--	--	--	--	--	--	--
All classes	1,817.5	165.9	--	2.5	--	523.6	14.3	22.9	294.0	151.1	643.2
Paper birch											
Hydric	2.5	--	--	--	--	--	--	--	--	--	2.5
Hydromesic	59.2	0.1	--	--	--	10.8	2.0	2.3	16.2	9.7	18.1
Mesic	51.1	0.9	--	--	--	11.8	--	4.9	12.2	2.5	18.8
Xeromesic	1.1	--	--	--	--	--	--	--	--	--	1.1
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	113.9	1.0	--	--	--	22.6	2.0	7.2	28.4	12.2	40.5
Exotic											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	3.9	--	--	--	--	--	--	--	--	2.2	1.7
Mesic	28.6	--	--	--	--	--	--	1.1	6.7	--	20.8
Xeromesic	24.7	--	--	--	--	--	--	--	7.1	6.9	10.7
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	57.2	--	--	--	--	--	--	1.1	13.8	9.1	33.2
Nonstocked											
Hydric	8.9	--	--	--	--	2.5	--	--	--	2.3	4.1
Hydromesic	9.4	--	--	--	--	1.7	--	--	6.0	1.7	--
Mesic	17.3	--	--	--	--	4.6	--	--	7.0	--	5.7
Xeromesic	25.8	--	--	--	--	10.9	--	--	2.3	5.0	7.6
Xeric	1.8	--	--	--	--	1.8	--	--	--	--	--
All classes	63.2	--	--	--	--	21.5	--	--	15.3	9.0	17.4
All types											
Hydric	149.5	8.1	--	--	--	55.4	--	2.3	28.9	14.3	40.5
Hydromesic	1,380.9	53.1	--	2.5	--	325.7	9.0	20.8	355.8	105.8	508.2
Mesic	3,684.0	201.5	--	--	--	1,002.5	26.3	52.9	809.6	279.3	1,311.9
Xeromesic	1,420.4	553.0	--	12.6	--	429.8	2.3	--	80.2	74.6	267.9
Xeric	60.1	43.8	--	--	--	11.7	--	--	--	--	4.6
All classes	6,694.9	859.5	--	15.1	--	1,825.1	37.6	76.0	1,274.5	474.0	2,133.1

Table 5.--Area of commercial forest land by ownership class and site class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All classes	Site class (cubic feet of growth per acre per year) 225+	165-224	120-164	85-119	50-84	20-49
National Forest	859.5	--	--	3.0	92.1	346.1	418.3
Bureau of Land Mgmt.	--	--	--	--	--	--	--
Miscellaneous federal	15.1	--	--	--	2.5	3.5	9.1
Indian	--	--	--	--	--	--	--
State	1,825.1	--	--	33.7	369.3	685.5	736.6
County and municipal	37.6	--	--	4.8	13.4	7.8	11.6
Forest industry	76.0	--	--	--	9.4	29.0	37.6
Farmer	1,274.5	--	--	53.8	294.0	509.6	417.1
Misc. private-corp.	474.0	--	--	15.1	120.6	184.4	153.9
Misc. private-indiv.	2,133.1	--	--	74.6	578.5	862.8	617.2
All owners	6,694.9	--	--	185.0	1,479.8	2,628.7	2,401.4

Table 6.--Area of commercial forest land by ownership class and stand-volume class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All classes	Stand-volume class (board feet[1/]) Less than 1,500	1,501 to 5,000	5,001+
National Forest	859.5	495.2	322.2	42.1
Bureau of Land Mgmt.	--	--	--	--
Miscellaneous federal	15.1	15.1	--	--
Indian	--	--	--	--
State	1,825.1	1,034.2	622.2	168.7
County and municipal	37.6	14.2	18.6	4.8
Forest industry	76.0	28.4	37.3	10.3
Farmer	1,274.5	541.6	552.5	180.4
Misc. private-corp.	474.0	226.9	149.0	98.1
Misc. private-indiv.	2,133.1	972.9	854.4	305.8
All owners	6,694.9	3,328.5	2,556.2	810.2

[1/]International 1/4-inch rule.

Table 7.--Area of privately owned commercial forest land by ownership class, owner tenure, and size of owner, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Ownership class and owner tenure class	Total	Size of owner (acres)								
		1-4	5-10	11-20	21-50	51-100	101-500	501-2,500	2,501-5,000	5001+
Forest Industry										
1-4 years	15.4	--	--	--	--	--	--	1.7	--	13.7
5-9 years	4.8	--	--	--	--	--	--	--	--	4.8
10-19 years	37.5	--	--	--	--	--	--	--	--	37.5
20+ years	18.3	--	2.7	--	--	2.3	--	--	1.1	12.2
All classes	76.0	--	2.7	--	--	2.3	--	1.7	1.1	68.2
Farmer										
1-4 years	212.4	10.3	7.3	6.2	50.3	56.9	67.1	9.6	4.7	--
5-9 years	216.3	2.3	6.5	12.1	59.7	42.9	86.0	6.8	--	--
10-19 years	331.9	2.2	4.5	27.1	81.6	75.1	111.3	25.3	2.3	2.5
20+ years	513.9	--	5.1	14.8	89.9	136.5	210.7	30.5	2.7	23.7
All classes	1,274.5	14.8	23.4	60.2	281.5	311.4	475.1	72.2	9.7	26.2
Misc. priv.-corporation										
1-4 years	55.0	--	--	2.2	4.9	2.0	20.7	18.3	4.7	2.2
5-9 years	85.4	--	--	2.6	7.1	14.2	30.8	21.6	4.5	4.6
10-19 years	85.2	--	2.7	--	6.8	2.7	24.2	25.4	2.2	21.2
20+ years	248.4	--	--	--	4.9	21.2	42.5	51.4	2.3	126.1
All classes	474.0	--	2.7	4.8	23.7	40.1	118.2	116.7	13.7	154.1
Misc. priv.-individual										
1-4 years	545.3	23.4	31.9	53.4	130.6	109.2	142.2	54.6	--	--
5-9 years	425.1	7.2	32.0	44.6	127.3	94.2	94.9	24.9	--	--
10-19 years	511.1	2.7	11.3	33.5	123.3	132.2	164.2	43.9	--	--
20+ years	651.6	17.2	12.2	32.3	169.0	129.8	210.6	79.4	--	1.1
All classes	2,133.1	50.5	87.4	163.8	550.2	465.4	611.9	202.8	--	1.1
All private owners										
1-4 years	828.1	33.7	39.2	61.8	185.8	168.1	230.0	84.2	9.4	15.9
5-9 years	731.6	9.5	38.5	59.3	194.1	151.3	211.7	53.3	4.5	9.4
10-19 years	965.7	4.9	18.5	60.6	211.7	210.0	299.7	94.6	4.5	61.2
20+ years	1,432.2	17.2	20.0	47.1	263.8	289.8	463.8	161.3	6.1	163.1
All classes	3,957.6	65.3	116.2	228.8	855.4	819.2	1,205.2	393.4	24.5	249.6

Table 8.--Area of commercial forest land by forest type, stand-size class, and ownership class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack pine											
Sawtimber	82.1	0.7	--	--	--	51.2	--	--	4.1	11.9	14.2
Poletimber	247.6	85.4	--	--	--	98.0	2.6	--	8.0	4.9	48.7
Sapling & seedling	177.0	61.6	--	1.8	--	76.1	2.3	--	10.6	--	24.6
All stands	506.7	147.7	--	1.8	--	225.3	4.9	--	22.7	16.8	87.5
Red pine											
Sawtimber	69.6	6.1	--	--	--	31.7	--	--	16.4	2.2	13.2
Poletimber	229.8	103.1	--	--	--	55.2	--	1.7	31.1	14.6	24.1
Sapling & seedling	127.6	79.3	--	--	--	19.6	1.7	--	7.5	2.4	17.1
All stands	427.0	188.5	--	--	--	106.5	1.7	1.7	55.0	19.2	54.4
White pine											
Sawtimber	51.8	--	--	--	--	13.0	--	--	8.9	8.6	21.3
Poletimber	12.3	--	--	--	--	2.5	--	--	2.6	4.5	2.7
Sapling & seedling	11.1	--	--	--	--	8.9	--	--	2.2	--	--
All stands	75.2	--	--	--	--	24.4	--	--	13.7	13.1	24.0
Balsam fir											
Sawtimber	16.7	--	--	--	--	--	--	--	2.3	4.3	10.1
Poletimber	20.0	--	--	--	--	3.0	--	--	4.5	6.4	6.1
Sapling & seedling	14.7	2.9	--	--	--	5.2	--	--	2.3	2.3	2.0
All stands	51.4	2.9	--	--	--	8.2	--	--	9.1	13.0	18.2
White spruce											
Sawtimber	4.7	--	--	--	--	--	--	--	4.7	--	--
Poletimber	4.5	--	--	--	--	2.0	--	--	--	--	2.5
Sapling & seedling	12.7	--	--	--	--	--	2.5	--	2.3	--	7.9
All stands	21.9	--	--	--	--	2.0	2.5	--	7.0	--	10.4
Black spruce											
Sawtimber	--	--	--	--	--	--	--	--	--	--	--
Poletimber	13.4	--	--	--	--	8.4	--	--	3.0	--	2.0
Sapling & seedling	14.6	--	--	--	--	6.0	--	--	1.9	2.5	4.2
All stands	28.0	--	--	--	--	14.3	--	--	5.0	2.5	6.2
Northern white-cedar											
Sawtimber	85.6	--	--	--	--	18.0	--	--	21.9	11.5	34.2
Poletimber	234.1	21.1	--	--	--	69.8	--	6.8	70.4	4.6	61.4
Sapling & seedling	35.8	--	--	--	--	11.1	--	--	15.5	--	9.2
All stands	355.5	21.1	--	--	--	99.0	--	6.8	107.8	16.0	104.8

(Table 8 continued on next page)

(Table 8 continued)

Forest type and stand-size class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Tamarack											
Sawtimber	6.6	--	--	--	--	--	--	--	--	--	6.6
Poletimber	6.3	--	--	--	--	2.0	--	--	2.0	--	2.3
Sapling & seedling	17.7	--	--	--	--	8.6	--	--	--	2.3	6.8
All stands	30.6	--	--	--	--	10.6	--	--	2.0	2.3	15.7
Oak-hickory											
Sawtimber	280.3	41.6	--	--	--	44.6	2.3	4.8	29.7	28.0	129.3
Poletimber	577.9	159.6	--	--	--	172.4	2.7	4.9	46.0	40.1	152.2
Sapling & seedling	209.9	36.2	--	10.8	--	54.9	--	--	15.4	12.6	80.0
All stands	1,068.1	237.4	--	10.8	--	271.9	5.0	9.7	91.1	80.7	361.5
Elm-ash-soft maple											
Sawtimber	125.2	7.5	--	--	--	25.9	--	4.7	30.4	13.8	42.9
Poletimber	153.6	13.0	--	--	--	31.4	--	7.0	37.8	11.0	53.4
Sapling & seedling	137.5	--	--	--	--	34.9	2.7	2.3	42.1	12.6	42.9
All stands	416.3	20.5	--	--	--	92.2	2.7	14.0	110.3	37.4	139.2
Maple-birch											
Sawtimber	470.9	5.9	--	--	--	77.0	2.0	10.1	160.9	31.3	183.7
Poletimber	864.7	66.5	--	--	--	219.4	2.5	2.5	247.6	47.0	279.2
Sapling & seedling	326.8	2.1	--	--	--	106.6	--	--	90.9	13.3	113.9
All stands	1,662.4	74.5	--	--	--	403.0	4.5	12.6	499.4	91.6	576.8
Aspen											
Sawtimber	310.7	4.9	--	--	--	78.9	2.2	2.3	74.1	34.3	114.0
Poletimber	661.5	67.4	--	2.5	--	143.9	9.6	4.8	130.3	41.1	261.9
Sapling & seedling	845.3	93.6	--	--	--	300.8	2.5	15.8	89.6	75.7	267.3
All stands	1,817.5	165.9	--	2.5	--	523.6	14.3	22.9	294.0	151.1	643.2
Paper birch											
Sawtimber	4.5	--	--	--	--	--	--	4.5	--	--	--
Poletimber	85.9	1.0	--	--	--	22.6	--	2.7	21.6	12.2	25.8
Sapling & seedling	23.5	--	--	--	--	--	2.0	--	6.8	--	14.7
All stands	113.9	1.0	--	--	--	22.6	2.0	7.2	28.4	12.2	40.5
Exotic											
Sawtimber	--	--	--	--	--	--	--	--	--	--	--
Poletimber	25.5	--	--	--	--	--	--	--	12.0	2.2	11.3
Sapling & seedling	31.7	--	--	--	--	--	--	1.1	1.8	6.9	21.9
All stands	57.2	--	--	--	--	--	--	1.1	13.8	9.1	33.2
Nonstocked	63.2	--	--	--	--	21.5	--	--	15.3	9.0	17.4
All types											
Sawtimber	1,508.7	66.7	--	--	--	340.3	6.5	26.4	353.4	145.9	569.5
Poletimber	3,137.1	517.1	--	2.5	--	830.6	17.4	30.4	616.9	188.6	933.6
Sapling & seedling	1,985.9	275.7	--	12.6	--	632.7	13.7	19.2	288.9	130.6	612.5
Nonstocked	63.2	--	--	--	--	21.5	--	--	15.3	8.9	17.5
All stands	6,694.9	859.5	--	15.1	--	1,825.1	37.6	76.0	1,274.5	474.0	2,133.1

Table 9.--Area of commercial forest land by forest type and county, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All counties	County										
		Alcona	Alpena	Antrim	Arena	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
Jack pine	506.7	18.5	1.8	--	2.6	--	--	--	20.8	28.8	85.2	--
Red pine	427.0	15.6	2.2	--	--	--	9.1	2.2	13.1	11.4	19.1	4.0
White pine	75.2	5.9	2.3	--	--	--	--	4.7	4.7	--	4.3	--
Balsam fir	51.4	3.2	8.5	--	--	--	--	2.2	6.8	--	2.4	--
White spruce	21.9	--	7.2	--	--	--	--	--	2.2	--	.0	3.0
Black spruce	28.0	3.7	--	--	--	--	--	2.8	5.2	--	6.5	--
Northern white-cedar	355.5	14.8	19.9	12.9	--	--	4.3	9.0	45.1	3.4	6.9	17.5
Tamarack	30.6	2.4	--	--	--	--	--	2.0	3.1	2.3	--	--
Oak-hickory	1,068.1	87.3	6.7	--	15.7	--	2.2	--	8.9	29.3	76.5	2.5
Elm-ash-soft maple	416.3	8.8	23.4	4.7	13.5	4.8	12.0	4.2	15.8	26.3	--	10.4
Maple-birch	1,662.4	34.9	21.9	111.8	15.8	6.2	75.1	86.2	112.0	38.3	35.6	109.8
Aspen	1,817.5	103.8	106.3	22.8	38.4	6.8	16.2	13.7	109.9	73.4	36.4	48.0
Paper birch	113.9	5.3	9.2	--	4.3	--	--	9.1	16.8	2.5	--	--
Exotic	57.2	--	--	2.2	2.4	--	2.2	--	--	--	--	--
Nonstocked	63.2	2.3	8.3	2.2	--	--	--	2.5	2.2	--	--	--
All types	6,694.9	306.5	217.7	156.6	92.7	17.8	121.1	138.6	366.6	215.7	272.9	195.2

(Table 9 continued)

(Table 9 continued)

Forest type	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
Jack pine	1.8	14.1	40.9	--	30.8	27.7	--	12.5	6.7	0.1	--	6.5
Red pine	--	19.3	40.2	4.0	31.9	33.2	2.6	20.5	9.7	4.4	--	4.0
White pine	--	2.3	2.2	--	3.9	7.3	2.5	1.8	--	2.5	2.7	2.3
Balsam fir	--	--	2.6	--	--	--	--	--	--	--	--	2.3
White spruce	--	--	--	--	--	--	--	--	--	2.7	--	--
Black spruce	--	--	1.6	--	--	--	--	--	--	--	--	--
Northern white-cedar	--	7.1	19.0	4.0	11.6	11.3	6.9	2.8	3.0	3.3	--	10.6
Tamarack	--	1.8	4.1	--	--	--	--	--	--	--	--	4.7
Oak-hickory	18.4	23.5	26.9	8.4	17.0	134.3	--	54.0	51.0	14.4	18.8	24.3
Elm-ash-soft maple	22.9	4.8	9.2	8.8	1.7	16.4	2.3	17.1	19.2	18.7	25.8	17.9
Maple-birch	11.7	38.8	33.9	14.2	90.5	27.5	59.2	68.8	18.4	26.1	32.1	50.6
Aspen	129.1	37.9	39.5	30.8	54.4	38.6	2.3	32.1	32.3	40.6	65.8	71.7
Paper birch	6.8	--	4.5	2.3	2.0	1.1	--	2.7	--	2.5	2.3	4.8
Exotic	--	2.6	--	2.4	1.8	2.4	--	4.4	6.1	5.1	--	4.7
Nonstocked	2.1	--	--	3.5	7.7	--	--	8.8	1.6	2.3	--	--
All types	192.8	152.2	224.6	78.4	253.3	299.8	75.8	225.5	148.0	122.7	147.5	204.4

(Table 9 continued on next page)

(Table 9 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
Jack pine	26.6	9.8	0.9	32.9	--	68.2	21.8	18.3	19.3	10.1
Red pine	12.2	26.4	15.4	4.1	--	32.8	21.8	7.7	7.4	52.7
White pine	4.5	2.7	--	--	--	5.4	8.3	--	2.3	2.6
Balsam fir	4.0	--	--	--	--	5.7	6.0	6.5	1.2	--
White spruce	--	--	--	--	--	--	2.5	--	2.0	2.3
Black spruce	--	--	--	--	--	2.1	1.9	4.2	--	--
Northern white-cedar	13.1	1.3	2.7	11.1	8.8	7.7	7.8	56.4	24.9	8.3
Tamarack	5.1	2.6	--	--	--	--	--	2.5	--	--
Oak-hickory	37.2	124.3	35.0	40.4	13.8	67.1	7.0	22.2	85.0	16.0
Elm-ash-soft maple	6.0	39.8	23.2	4.1	13.8	2.3	--	14.7	10.6	13.1
Maple-birch	85.6	43.9	35.7	30.1	69.4	27.1	120.4	26.0	24.2	80.6
Aspen	89.1	52.6	29.0	83.6	45.3	88.7	63.3	94.0	67.5	53.6
Paper birch	2.5	--	--	11.4	2.3	0.1	--	14.4	2.3	4.7
Exotic	4.1	6.6	2.5	--	3.4	--	--	--	--	4.3
Nonstocked	12.0	--	3.9	1.8	--	--	--	--	--	2.0
All types	302.0	310.0	148.3	219.5	156.8	307.2	260.8	266.9	246.7	250.3

Table 10.--Area of commercial forest land by county and stand-size class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Alcona	306.5	74.8	152.0	77.4	2.3
Alpena	217.7	55.7	85.3	68.4	8.3
Antrim	156.6	25.1	107.1	22.2	2.2
Arenac	92.7	16.2	46.5	30.0	--
Bay	17.8	2.0	8.8	7.0	--
Benzie	121.1	29.2	56.0	35.9	--
Charlevoix	138.6	46.5	80.9	8.8	2.4
Cheboygan	366.6	74.7	207.2	82.5	2.2
Clare	215.7	50.0	77.5	88.2	--
Crawford	272.9	35.8	136.5	100.6	--
Emmet	195.2	54.1	114.2	26.9	--
Gladwin	192.8	36.3	89.9	64.5	2.1
Grand Traverse	152.2	43.6	70.8	37.8	--
Iosco	224.6	49.7	115.7	59.2	--
Isabella	78.4	24.3	20.4	30.2	3.5
Kalkaska	253.3	39.6	129.8	76.2	7.7
Lake	299.8	67.4	162.8	69.6	--
Leelanau	75.8	42.1	24.4	9.3	--
Manistee	225.5	57.9	83.2	75.6	8.8
Mason	148.0	40.5	70.0	35.9	1.6
Mecosta	122.7	32.4	34.6	53.4	2.3
Midland	147.5	41.3	60.3	45.9	--
Missaukee	204.4	39.7	79.2	85.5	--
Montmorency	302.0	40.6	107.9	141.5	12.0
Newaygo	310.0	86.6	126.1	97.3	--
Oceana	148.3	44.3	64.7	35.4	3.9
Ogemaw	219.5	35.3	117.8	64.6	1.8
Osceola	156.8	66.6	39.6	50.6	--
Oscoda	307.2	52.0	125.9	129.3	--
Otsego	260.8	43.2	137.0	80.6	--
Presque Isle	266.9	54.4	125.4	87.1	--
Roscommon	246.7	58.3	137.6	50.8	--
Wexford	250.3	48.5	142.0	57.7	2.1
All counties	6,694.9	1,508.7	3,137.1	1,985.9	63.2

Table 11.--Area of commercial forest land by forest type, stand-size class, and site class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	20-49
Jack pine							
Sawtimber	82.1	--	--	--	2.3	19.7	60.1
Poletimber	247.6	--	--	--	7.1	36.9	203.6
Sapling & seedling	177.0	--	--	--	--	12.0	165.0
All stands	506.7	--	--	--	9.4	68.6	428.7
Red pine							
Sawtimber	69.6	--	--	--	35.2	30.0	4.4
Poletimber	229.8	--	--	28.7	103.8	77.3	20.0
Sapling & seedling	127.6	--	--	6.9	19.7	89.0	12.0
All stands	427.0	--	--	35.6	158.7	196.3	36.4
White pine							
Sawtimber	51.8	--	--	4.7	20.2	18.2	8.7
Poletimber	12.3	--	--	--	5.0	7.3	--
Sapling & seedling	11.1	--	--	2.2	2.2	2.2	4.5
All stands	75.2	--	--	6.9	27.4	27.7	13.2
Balsam fir							
Sawtimber	16.7	--	--	2.2	9.4	2.3	2.8
Poletimber	20.0	--	--	--	10.6	9.4	--
Sapling & seedling	14.7	--	--	4.3	9.2	1.2	--
All stands	51.4	--	--	6.5	29.2	12.9	2.8
White spruce							
Sawtimber	4.7	--	--	--	--	2.5	2.2
Poletimber	4.5	--	--	--	--	--	4.5
Sapling & seedling	12.7	--	--	--	8.2	2.2	2.3
All stands	21.9	--	--	--	8.2	4.7	9.0
Black spruce							
Sawtimber	--	--	--	--	--	--	--
Poletimber	13.4	--	--	--	4.8	2.0	6.6
Sapling & seedling	14.6	--	--	--	--	1.7	12.9
All stands	28.0	--	--	--	4.8	3.7	19.5
Northern white-cedar							
Sawtimber	85.6	--	--	--	--	13.8	71.8
Poletimber	234.1	--	--	--	2.3	31.4	200.4
Sapling & seedling	35.8	--	--	--	--	2.2	33.6
All stands	355.5	--	--	--	2.3	47.4	305.8

(Table 11 continued on next page)

(Table 11 continued)

Forest type and stand-size class	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	20-49
Tamarack							
Sawtimber	6.6	--	--	--	--	4.3	2.3
Poletimber	6.3	--	--	--	2.3	4.0	--
Sapling & seedling	17.7	--	--	--	--	3.1	14.6
All stands	30.6	--	--	--	2.3	11.4	16.9
Oak-hickory							
Sawtimber	280.3	--	--	2.2	37.8	116.3	124.0
Poletimber	577.9	--	--	--	53.8	275.6	248.5
Sapling & seedling	209.9	--	--	--	7.2	74.4	128.3
All stands	1,068.1	--	--	2.2	98.8	466.3	500.8
Elm-ash-soft maple							
Sawtimber	125.2	--	--	--	23.6	38.4	63.2
Poletimber	153.6	--	--	--	8.8	42.2	102.6
Sapling & seedling	137.5	--	--	--	4.2	42.1	91.2
All stands	416.3	--	--	--	36.6	122.7	257.0
Maple-birch							
Sawtimber	470.9	--	--	19.4	139.6	237.6	74.3
Poletimber	864.7	--	--	28.3	177.6	448.2	210.6
Sapling & seedling	326.8	--	--	2.7	32.9	134.4	156.8
All stands	1,662.4	--	--	50.4	350.1	820.2	441.7
Aspen							
Sawtimber	310.7	--	--	27.9	142.9	102.4	37.5
Poletimber	661.5	--	--	18.3	260.8	313.3	69.1
Sapling & seedling	845.3	--	--	31.4	312.6	356.4	144.9
All stands	1,817.5	--	--	77.6	716.3	772.1	251.5
Paper birch							
Sawtimber	4.5	--	--	--	--	2.2	2.3
Poletimber	85.9	--	--	--	4.9	31.7	49.3
Sapling & seedling	23.5	--	--	--	--	8.4	15.1
All stands	113.9	--	--	--	4.9	42.3	66.7
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	25.5	--	--	3.5	17.3	4.7	--
Sapling & seedling	31.7	--	--	2.3	8.5	13.6	7.3
All stands	57.2	--	--	5.8	25.8	18.3	7.3
Nonstocked	63.2	--	--	--	5.0	14.1	44.1
All types							
Sawtimber	1,508.7	--	--	56.4	411.0	587.7	453.6
Poletimber	3,137.1	--	--	78.8	659.1	1,284.0	1,115.2
Sapling & seedling	1,985.9	--	--	49.8	404.7	742.9	788.5
Nonstocked	63.2	--	--	--	5.0	14.1	44.1
All stands	6,694.9	--	--	185.0	1,479.8	2,628.7	2,401.4

Table 12.--Area of commercial forest land by forest type and stand-age class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All ages	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	506.7	46.5	85.5	52.2	94.6	95.0	57.5	23.1	34.9	9.9	2.7	2.3	2.5	--
Red pine	427.0	39.0	82.5	144.3	66.1	46.6	6.2	11.8	8.5	9.4	4.4	8.2	--	--
White pine	75.2	2.2	8.9	5.2	--	7.1	6.9	4.0	10.3	9.6	13.6	2.5	4.9	--
Balsam fir	51.4	--	12.5	2.2	--	4.5	8.1	9.4	2.3	5.0	--	2.3	5.1	--
White spruce	21.9	2.2	10.5	--	--	--	2.0	--	--	5.0	--	--	--	2.2
Black spruce	28.0	7.0	5.8	--	--	6.8	3.5	1.9	3.0	--	--	--	--	--
Northern white-cedar	355.5	5.7	9.8	13.0	15.0	13.4	45.0	51.6	48.1	50.2	32.5	36.7	16.9	17.6
Tamarack	30.6	7.8	2.3	4.4	5.5	--	4.0	2.5	1.8	--	--	2.3	--	--
Oak-hickory	1,068.1	124.8	76.7	14.0	49.3	111.7	233.7	164.6	74.1	68.5	58.6	72.1	17.6	2.4
Elm-ash-soft maple	416.3	62.1	50.7	20.3	31.5	52.8	37.8	46.9	37.3	22.3	15.5	23.0	16.1	--
Maple-birch	1,662.4	167.7	125.2	47.5	104.1	289.0	330.3	167.0	115.2	132.3	77.7	86.5	19.9	--
Aspen	1,817.5	410.7	378.3	80.2	132.0	225.1	240.1	119.3	88.9	58.5	41.7	34.0	8.7	--
Paper birch	113.9	10.1	10.7	2.7	10.2	10.2	30.5	28.4	8.7	0.1	2.3	--	--	--
Exotic	57.2	6.0	20.7	20.1	6.0	2.2	2.2	--	--	--	--	--	--	--
Nonstocked	63.2	32.1	14.8	6.5	1.6	4.2	1.8	--	--	2.2	--	--	--	--
All types	6,694.9	923.9	894.9	412.6	515.9	868.6	1,009.6	630.5	433.1	373.0	249.0	269.9	91.7	22.2

Table 13.--Area of commercial forest land by forest type and site-index class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All classes	Site-index class (feet)								
		11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
Jack pine	506.7	--	--	60.8	200.7	183.5	46.4	7.8	7.5	--
Red pine	427.0	--	--	2.6	90.9	139.2	108.3	66.3	19.7	--
White pine	75.2	--	--	6.4	12.1	22.5	22.4	7.1	4.7	--
Balsam fir	51.4	--	--	2.8	17.2	24.9	4.2	2.3	--	--
White spruce	21.9	--	4.7	4.3	2.2	2.5	--	5.5	2.7	--
Black spruce	28.0	--	1.9	9.9	7.6	3.7	4.9	--	--	--
Northern white-cedar	355.5	15.4	120.4	142.6	51.1	12.3	11.4	2.3	--	--
Tamarack	30.6	--	8.2	8.7	--	8.3	3.1	--	2.3	--
Oak-hickory	1,068.1	--	2.3	49.4	271.5	339.9	244.2	119.1	29.6	12.1
Elm-ash-soft maple	416.3	--	5.5	39.6	48.5	97.1	120.2	68.8	13.8	22.8
Maple-birch	1,662.4	--	--	27.5	116.6	297.5	465.8	477.0	210.7	67.3
Aspen	1,817.5	--	2.7	24.6	104.9	273.0	507.8	532.9	293.9	77.7
Paper birch	113.9	--	0.1	9.8	18.0	34.1	33.7	13.3	4.9	--
Exotic	57.2	--	--	--	12.5	13.0	21.0	9.6	--	1.1
Nonstocked	63.2	--	1.6	11.3	23.4	12.7	6.6	7.6	--	--
All types	6,694.9	15.4	147.4	400.3	977.2	1,464.2	1,600.0	1,319.6	589.8	181.0

Table 14.--Area of commercial forest land by forest type, stand-size class, and basal-area class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	82.1	--	--	4.2	9.4	9.9	7.2	20.6	12.3	6.5	7.4	4.6	--	--	--
Poletimber	247.6	--	--	7.0	5.1	51.1	13.5	32.5	40.9	24.0	35.8	22.0	15.7	--	--
Sapling & seedling	177.0	14.0	9.7	16.0	29.5	33.5	23.6	21.5	12.0	4.9	4.1	.00	8.2	--	--
All stands	506.7	14.0	9.7	27.2	44.0	94.5	44.3	74.6	65.2	35.4	47.3	26.6	23.9	--	--
Red pine															
Sawtimber	69.6	--	--	--	6.3	6.5	--	8.8	8.5	4.3	2.0	12.6	9.2	7.9	3.5
Poletimber	229.8	--	--	--	2.2	2.2	8.9	9.3	29.2	18.2	16.1	28.7	44.1	46.0	24.9
Sapling & seedling	127.6	34.9	3.9	6.5	2.2	6.2	28.9	17.8	14.0	7.3	--	3.5	2.4	--	--
All stands	427.0	34.9	3.9	6.5	10.7	14.9	37.8	35.9	51.7	29.8	18.1	44.8	55.7	53.9	28.4
White pine															
Sawtimber	51.8	--	--	--	4.0	3.8	--	6.1	5.0	10.8	5.4	11.9	--	4.8	--
Poletimber	12.3	--	--	--	--	--	2.2	2.6	2.5	2.4	--	2.6	--	--	--
Sapling & seedling	11.1	--	--	2.2	--	4.4	2.3	2.2	--	--	--	--	--	--	--
All stands	75.2	--	--	2.2	4.0	8.2	4.5	10.9	7.5	13.2	5.4	14.5	--	4.8	--
Balsam fir															
Sawtimber	16.7	--	--	--	--	--	4.5	--	--	--	6.7	2.7	--	2.8	--
Poletimber	20.0	--	--	--	--	4.1	2.2	1.8	2.3	--	--	4.3	5.3	--	--
Sapling & seedling	14.7	--	3.0	--	--	4.3	--	--	4.5	2.9	--	--	--	--	--
All stands	51.4	--	3.0	--	--	8.4	6.7	1.8	6.8	2.9	6.7	7.0	5.3	2.8	--
White spruce															
Sawtimber	4.7	--	--	--	--	--	--	--	--	--	2.5	2.2	--	--	--
Poletimber	4.5	--	--	--	--	--	--	--	--	2.0	--	2.5	--	--	--
Sapling & seedling	12.7	2.3	3.0	--	2.2	--	--	--	2.5	--	--	2.7	--	--	--
All stands	21.9	2.3	3.0	--	2.2	--	--	--	2.5	2.0	2.5	7.4	--	--	--
Black spruce															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	13.4	--	--	1.6	--	--	--	2.0	--	2.0	2.0	2.8	--	3.0	--
Sapling & seedling	14.6	2.2	7.1	--	1.7	--	--	1.6	--	--	--	--	2.0	--	--
All stands	28.0	2.2	7.1	1.6	1.7	--	--	3.6	--	2.0	2.0	2.8	2.0	3.0	--
Northern white-cedar															
Sawtimber	85.6	--	--	--	--	--	--	2.6	--	--	8.8	14.1	18.4	19.6	22.1
Poletimber	234.1	--	--	--	2.3	--	4.1	4.0	9.6	6.4	3.3	27.8	66.5	49.1	61.0
Sapling & seedling	35.8	2.5	2.2	--	--	2.0	--	2.3	5.8	--	7.4	4.6	5.9	3.1	--
All stands	355.5	2.5	2.2	--	2.3	2.0	4.1	8.9	15.4	6.4	19.5	46.5	90.8	71.8	83.1

(Table 14 continued on next page)

(Table 14 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	6.6	--	--	1.8	2.3	--	--	--	2.5	--	--	--	--	--	--
Poletimber	6.3	--	--	--	--	--	--	2.0	--	2.3	--	2.0	--	--	--
Sapling & seedling	17.7	--	--	10.9	--	--	--	2.6	4.2	--	--	--	--	--	--
All stands	30.6	--	--	12.7	2.3	--	--	4.6	6.7	2.3	--	2.0	--	--	--
Oak-hickory															
Sawtimber	280.3	1.7	--	2.0	7.7	21.5	17.5	38.5	44.0	38.1	40.9	44.4	19.2	4.8	--
Poletimber	577.9	--	1.1	--	4.3	38.3	69.2	70.7	83.3	77.9	79.9	97.1	43.4	10.7	2.0
Sapling & seedling	209.9	32.3	44.5	28.3	30.4	32.1	22.2	14.2	1.2	1.2	3.5	--	--	--	--
All stands	1,068.1	34.0	45.6	30.3	42.4	91.9	108.9	123.4	128.5	117.2	124.3	141.5	62.6	15.5	2.0
Elm-ash-soft maple															
Sawtimber	125.2	--	--	4.5	6.2	14.2	6.9	12.4	13.1	1.2	10.5	23.5	25.5	4.5	2.7
Poletimber	153.6	--	3.8	3.4	5.8	13.2	7.4	8.4	16.7	7.2	24.6	28.5	20.9	11.4	2.3
Sapling & seedling	137.5	17.9	10.6	18.9	22.3	27.1	18.0	7.1	6.5	--	4.8	4.3	--	--	--
All stands	416.3	17.9	14.4	26.8	34.3	54.5	32.3	27.9	36.3	8.4	39.9	56.3	46.4	15.9	5.0
Maple-birch															
Sawtimber	470.9	--	2.7	--	6.7	20.5	17.6	28.9	52.7	33.7	71.5	107.1	98.1	24.0	7.4
Poletimber	864.7	--	1.7	5.0	19.5	33.5	36.8	59.2	91.1	68.6	109.7	207.9	158.7	65.3	7.7
Sapling & seedling	326.8	43.8	44.1	23.9	74.2	43.1	42.7	33.3	7.6	2.6	9.4	2.1	--	--	--
All stands	1,662.4	43.8	48.5	28.9	100.4	97.1	97.1	121.4	151.4	104.9	190.6	317.1	256.8	89.3	15.1
Aspen															
Sawtimber	310.7	--	--	1.7	11.5	19.5	11.5	28.1	38.4	20.6	37.2	46.3	55.3	24.0	16.6
Poletimber	661.5	--	--	4.8	21.6	43.5	40.2	88.5	87.7	66.3	108.1	82.6	89.8	26.1	2.3
Sapling & seedling	845.3	106.7	98.4	88.9	133.7	136.0	76.4	99.7	35.1	13.6	29.1	14.5	13.2	--	--
All stands	1,817.5	106.7	98.4	95.4	166.8	199.0	128.1	216.3	161.2	100.5	174.4	143.4	158.3	50.1	18.9
Paper birch															
Sawtimber	4.5	--	--	--	--	--	2.2	--	--	--	2.3	--	--	--	--
Poletimber	85.9	--	--	--	2.3	2.7	6.7	9.6	7.5	4.9	8.8	14.5	23.1	5.8	--
Sapling & seedling	23.5	2.3	4.5	2.2	2.2	4.1	3.0	2.5	--	--	2.7	--	--	--	--
All stands	113.9	2.3	4.5	2.2	4.5	6.8	11.9	12.1	7.5	4.9	13.8	14.5	23.1	5.8	--
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	25.5	--	--	--	--	--	--	--	2.2	2.4	8.5	8.9	1.1	2.4	--
Sapling & seedling	31.7	1.1	6.0	2.4	2.4	4.3	--	--	9.4	.00	3.5	--	2.6	--	--
All stands	57.2	1.1	6.0	2.4	2.4	4.3	--	--	11.6	2.4	12.0	8.9	3.7	2.4	--
Nonstocked	63.2	42.6	14.0	--	2.1	2.3	--	2.2	--	--	--	--	--	--	--
All types															
Sawtimber	1,508.7	1.7	2.7	14.2	54.1	95.9	67.4	146.0	176.5	115.2	195.2	269.4	225.7	92.4	52.3
Poletimber	3,137.1	--	6.6	21.8	63.1	188.6	191.2	290.6	373.0	284.6	396.8	532.2	468.6	219.8	100.2
Sapling & seedling	1,985.9	260.0	237.0	200.2	300.8	297.1	217.1	204.8	102.8	32.5	64.5	31.7	34.3	3.1	--
Nonstocked	63.2	42.6	14.0	--	2.1	2.3	--	2.2	--	--	--	--	--	--	--
All stands	6,694.9	304.3	260.3	236.2	420.1	583.9	475.7	643.6	652.3	432.3	656.5	833.3	728.6	315.3	152.5

Table 15.--Area of commercial forest land by stocking class of growing-stock trees and stand-size class, Northern Lower Peninsula, Michigan, 1980

Stocking class (percent)	All stands	Stand-size class			
		Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Less than 16.7	63.2	--	--	--	63.2
16.7 to 60.9	772.0	153.0	242.2	376.8	--
61.0 to 100.9	2,658.4	583.9	1,227.6	846.9	--
101.0 to 133.9	2,593.3	659.7	1,356.0	577.6	--
134.0+	608.0	112.1	311.3	184.6	--
All classes	6,694.9	1,508.7	3,137.1	1,985.9	63.2

Table 16.--Area of commercial forest land by stocking class based on selected stand components, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Stocking class (percent)	Stocking classified in terms of				
	All live trees	Growing-stock trees	Desirable trees	Acceptable trees	Rough and rotten trees
0-10	14.6	28.0	6,536.4	28.0	4,367.5
11-20	34.7	56.4	120.4	56.4	1,491.6
21-30	47.6	80.6	28.2	85.7	528.3
31-40	66.0	126.8	5.0	136.8	194.6
41-50	87.5	203.7	--	207.1	79.3
51-60	185.0	339.7	2.2	342.2	18.9
61-70	380.0	459.3	--	475.2	7.8
71-80	364.4	531.0	2.7	546.9	4.9
81-90	603.6	806.1	--	839.3	2.0
91-100	798.0	862.0	--	904.7	--
101-110	884.8	904.2	--	917.1	--
111-120	974.0	825.9	--	794.8	--
121-130	904.9	676.8	--	646.0	--
131-140	652.8	449.5	--	408.5	--
141-150	470.3	249.4	--	222.5	--
151-160	216.6	95.5	--	83.7	--
161+	10.1	--	--	--	--
All classes	6,694.9	6,694.9	6,694.9	6,694.9	6,694.9

Table 17.--Area of noncommercial forest land by ownership class, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All areas	Productive-reserved areas[1/]	Unproductive areas
National Forest	13.6	4.9	8.7
Bureau of Land Management	--	--	--
Indian	--	--	--
Miscellaneous federal	25.0	21.5	3.5
State	97.0	82.4	14.6
County and municipal	3.0	3.0	--
Forest industry	1.7	--	1.7
Farmer	31.9	16.2	15.7
Misc. private-corp.	18.5	6.1	12.4
Misc. private-indiv.	44.0	12.9	31.1
All owners	234.7	147.0	87.7

[1/]Includes 4.8 thousand acres of productive-deferred areas and 35.2 thousand acres of Christmas tree production areas.

Table 18.--Area of noncommercial forest land by forest type, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All areas	Productive-reserved areas[1/]	Unproductive areas
Jack pine	13.9	7.8	6.1
Red pine	5.3	5.2	0.1
White pine	2.0	0.4	1.6
Balsam fir	5.9	3.4	2.5
White spruce	2.3	2.3	--
Black spruce	0.8	0.5	0.3
Northern white-cedar	26.5	4.4	22.1
Tamarack	3.9	0.1	3.8
Oak-hickory	42.1	36.1	6.0
Elm-ash-soft maple	37.1	16.2	20.9
Maple-birch	31.0	28.0	3.0
Aspen	18.2	12.5	5.7
Paper birch	5.0	--	5.0
Exotic	29.8	29.8	--
Nonstocked	10.9	0.3	10.6
All types	234.7	147.0	87.7

[1/]Includes 4.8 thousand acres of productive-deferred areas and 35.2 thousand acres of Christmas tree production areas.

Table 19.--Area of nonforest land with trees by forest type and land use, Northern Lower Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All uses	Land use							
		Cropland	Improved pasture	Wooded strips	Idle farmland	Marsh	Wind-breaks	Urban and other windbreaks	Wooded pasture
Jack pine	10.7	4.7	2.4	--	--	1.2	2.4	--	--
Red pine	8.9	--	2.3	6.6	--	--	--	--	--
White pine	2.2	--	--	--	--	2.2	--	--	--
Balsam fir	2.5	--	--	--	--	2.5	--	--	--
White spruce	4.5	--	2.3	--	--	--	--	--	2.2
Black spruce	2.3	--	--	--	--	2.3	--	--	--
Northern white-cedar	6.6	--	--	--	--	6.6	--	--	--
Tamarack	1.7	--	--	--	--	1.7	--	--	--
Oak-hickory	38.9	13.9	22.8	2.2	--	--	--	--	--
Elm-ash-soft maple	53.8	4.5	2.3	2.8	--	44.2	--	--	--
Maple-birch	57.1	14.6	16.5	17.6	--	3.3	5.1	--	--
Aspen	50.6	9.0	13.7	4.6	2.3	21.0	--	--	--
Paper birch	12.8	--	--	--	--	12.8	--	--	--
Exotic	--	--	--	--	--	--	--	--	--
All types	252.6	46.7	62.3	33.8	2.3	97.8	7.5	--	2.2

Table 20.--Number of all live trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS															
White pine	74,229	42,672	16,657	5,569	3,241	1,870	1,337	957	740	501	292	150	219	23	1
Red pine	212,890	43,079	65,548	66,286	24,576	7,498	2,936	1,164	831	575	228	133	36	--	--
Jack pine	240,475	92,871	62,870	45,690	25,241	10,448	2,354	830	144	23	4	--	--	--	--
White spruce	14,006	3,980	4,160	3,151	1,220	856	341	179	67	27	13	10	2	--	--
Black spruce	30,862	13,001	9,505	4,993	2,559	675	98	25	6	--	--	--	--	--	--
Balsam fir	157,596	95,136	34,412	17,844	7,294	2,251	516	104	39	--	--	--	--	--	--
Hemlock	28,861	9,752	9,145	4,279	2,572	1,149	770	602	239	184	84	35	50	--	--
Tamarack	32,764	14,880	11,646	4,060	1,321	560	217	64	13	--	--	3	--	--	--
Northern white-cedar	346,490	119,700	107,521	70,005	31,708	11,979	3,631	1,416	377	91	55	7	--	--	--
Other softwoods	48,770	13,145	22,997	9,968	2,346	289	--	22	--	--	3	--	--	--	--
Total	1,186,943	448,216	344,461	231,845	102,078	37,575	12,200	5,363	2,456	1,401	679	338	307	23	1
HARDWOODS															
Select white oaks	93,778	29,690	26,550	15,968	10,034	5,601	3,258	1,228	721	373	180	103	59	13	--
Select red oaks	184,684	82,093	22,993	24,728	21,690	15,450	8,546	4,265	2,366	1,417	570	286	235	42	3
Other red oaks	46,854	14,925	6,577	10,621	6,383	4,206	2,061	991	492	383	93	57	59	6	--
Hickory	941	--	761	--	76	54	36	9	--	5	--	--	--	--	--
Yellow birch	14,892	4,096	4,596	2,773	1,414	1,052	566	188	131	49	12	10	5	--	--
Hard maple	456,684	247,472	108,653	51,407	25,800	12,779	5,571	2,691	1,246	526	262	106	150	20	1
Soft maple	497,187	271,109	109,399	58,005	30,606	15,114	7,005	3,099	1,455	699	392	138	141	18	7
Beech	53,254	31,598	8,062	5,603	2,782	1,855	916	920	587	436	247	131	107	10	--
Ash	230,160	139,386	48,271	22,838	9,925	5,175	2,542	1,207	510	199	57	21	22	5	2
Balsam poplar	39,500	24,187	5,001	3,029	2,722	1,559	1,181	865	532	239	116	52	12	5	--
Cottonwood	690	--	--	167	175	117	89	50	29	14	26	13	7	--	3
Bigtooth aspen	323,398	178,209	56,183	32,607	25,267	17,102	9,018	3,218	1,196	412	101	49	36	--	--
Quaking aspen	523,146	352,549	75,459	39,396	25,377	15,818	8,621	3,619	1,590	482	184	43	8	--	--
Basswood	52,396	10,905	5,905	11,188	9,505	7,869	3,834	1,914	765	317	112	46	31	5	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	17	--	--	--	--	17	--	--	--	--	--	--	--	--	--
Black cherry	83,870	53,218	12,733	8,299	4,937	2,709	932	659	257	59	41	24	2	--	--
Butternut	15	--	--	--	--	--	--	15	--	--	--	--	--	--	--
Elm	55,885	37,322	11,512	3,931	1,733	880	343	73	61	22	8	--	--	--	--
Paper birch	104,330	29,550	26,001	25,720	14,082	6,057	2,018	591	246	52	13	--	--	--	--
Other hardwoods	16,069	11,244	3,159	911	216	208	136	81	38	26	25	13	11	1	--
Noncommercial species	105,041	83,915	13,798	5,538	1,301	396	80	9	--	--	4	--	--	--	--
Total	2,882,791	1,601,468	545,613	322,729	194,025	114,018	56,753	25,692	12,222	5,710	2,443	1,092	885	125	16
All species	4,069,734	2,049,684	890,074	554,574	296,103	151,593	68,953	31,055	14,678	7,111	3,122	1,430	1,192	148	17

Table 21.--Number of growing-stock trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS															
White pine	72,416	42,143	16,371	5,212	3,030	1,712	1,163	914	699	501	292	142	213	23	1
Red pine	209,751	42,084	64,932	65,165	24,319	7,404	2,896	1,164	831	563	224	133	36	--	--
Jack pine	217,042	81,759	57,096	41,194	24,035	9,882	2,298	621	130	23	4	--	--	--	--
White spruce	13,476	3,978	3,929	2,899	1,220	818	341	172	67	27	13	10	2	--	--
Black spruce	30,084	12,697	9,305	4,817	2,475	675	84	25	6	--	--	--	--	--	--
Balsam fir	153,463	92,281	33,717	17,545	7,086	2,193	498	104	39	--	--	--	--	--	--
Hemlock	26,846	9,172	8,895	3,635	2,341	1,032	706	522	216	170	84	31	42	--	--
Tamarack	29,194	13,048	10,745	3,476	1,147	500	207	55	13	--	--	3	--	--	--
Northern white-cedar	313,223	108,772	99,341	63,042	28,010	9,744	2,860	1,074	283	62	28	7	--	--	--
Other softwoods	40,975	10,435	20,663	7,758	1,860	234	--	22	--	--	3	--	--	--	--
Total	1,106,470	416,369	324,994	214,743	95,523	34,194	11,053	4,673	2,284	1,346	648	326	293	23	1
HARDWOODS															
Select white oaks	84,370	26,866	23,249	14,014	9,616	5,300	2,998	1,100	642	313	161	68	37	6	--
Select red oaks	175,671	79,315	21,473	23,413	20,792	14,314	7,829	3,924	2,251	1,306	537	266	215	33	3
Other red oaks	39,432	12,235	5,581	8,613	5,495	3,764	1,866	870	456	359	87	51	49	6	--
Hickory	941	--	761	--	76	54	36	9	--	5	--	--	--	--	--
Yellow birch	13,378	4,096	4,367	2,248	1,167	802	407	138	92	43	8	7	3	--	--
Hard maple	430,159	227,668	106,778	49,604	24,307	12,094	5,184	2,487	1,147	466	223	93	97	10	1
Soft maple	473,943	258,126	105,308	55,588	29,171	14,070	6,408	2,808	1,268	621	347	99	110	12	7
Beech	50,283	31,002	8,009	4,817	2,435	1,546	696	712	442	319	171	88	41	5	--
Ash	213,281	131,347	43,426	20,257	9,074	4,925	2,346	1,138	484	187	53	21	18	5	--
Balsam poplar	36,872	22,855	4,558	2,824	2,546	1,426	1,031	763	469	221	116	49	9	5	--
Cottonwood	633	--	--	123	174	117	89	50	29	9	26	6	7	--	3
Bigtooth aspen	300,375	166,505	51,651	29,379	23,868	16,403	8,252	2,899	922	362	87	25	22	--	--
Quaking aspen	485,409	334,669	66,585	34,062	23,150	14,479	7,606	3,059	1,287	366	124	19	3	--	--
Basswood	49,953	10,216	5,785	10,359	9,159	7,723	3,699	1,836	722	306	87	35	21	5	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	17	--	--	--	--	17	--	--	--	--	--	--	--	--	--
Black cherry	68,965	46,822	9,823	5,043	3,649	2,067	734	544	176	54	33	18	2	--	--
Butternut	15	--	--	--	--	--	--	15	--	--	--	--	--	--	--
Elm	50,258	34,470	9,910	3,297	1,459	670	320	50	56	22	4	--	--	--	--
Paper birch	94,864	26,066	23,988	23,457	13,186	5,635	1,738	520	228	38	8	--	--	--	--
Other hardwoods	11,429	8,159	2,128	552	168	176	90	65	32	22	20	10	7	--	--
Total	2,580,248	1,420,417	493,380	287,650	179,492	105,582	51,329	22,987	10,703	5,019	2,092	855	641	87	14
All species	3,686,718	1,836,786	818,374	502,393	275,015	139,776	62,382	27,660	12,987	6,365	2,740	1,181	934	110	15

Table 22.--Number of short-log trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS											
White pine	216	107	66	18	21	--	--	4	--	--	--
Red pine	33	14	13	--	--	6	--	--	--	--	--
Jack pine	345	268	21	50	6	--	--	--	--	--	--
White spruce	20	20	--	--	--	--	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	24	17	7	--	--	--	--	--	--	--	--
Hemlock	112	67	--	33	7	--	--	--	5	--	--
Tamarack	58	48	10	--	--	--	--	--	--	--	--
Northern white-cedar	1,006	623	234	104	22	20	3	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	1,814	1,164	351	205	56	26	3	4	5	--	--
HARDWOODS											
Select white oaks	292	--	156	67	33	--	12	7	14	3	--
Select red oaks	640	--	357	140	46	65	13	7	5	7	--
Other red oaks	111	--	45	36	21	5	--	--	4	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	115	--	73	17	25	--	--	--	--	--	--
Hard maple	395	--	201	61	38	27	22	7	33	6	--
Soft maple	549	--	272	110	87	31	19	22	8	--	--
Beech	214	--	31	67	22	30	13	21	25	5	--
Ash	104	--	75	8	14	5	--	--	--	--	2
Balsam poplar	39	--	28	--	7	4	--	--	--	--	--
Cottonwood	3	--	--	--	--	--	--	3	--	--	--
Bigtooth aspen	328	--	172	78	47	16	7	3	5	--	--
Quaking aspen	379	--	213	63	56	27	8	10	2	--	--
Basswood	122	--	58	28	14	10	9	3	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	82	--	38	18	18	--	8	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	36	--	8	24	--	--	4	--	--	--	--
Paper birch	150	--	115	19	6	5	5	--	--	--	--
Other hardwoods	5	--	--	--	--	5	--	--	--	--	--
Total	3,564	--	1,842	736	434	230	120	83	96	21	2
All species	5,378	1,164	2,193	941	490	256	123	87	101	21	2

Table 23.--Net volume of growing stock on commercial forest land by species group, Northern Lower Peninsula, Michigan, 1966 and 1980

(In million cubic feet)

Species group	1966[1/]	1980
SOFTWOODS		
White pine	89.5	176.8
Red pine	116.7	452.5
Jack pine	188.8	335.9
White spruce	32.7	38.7
Black spruce	24.7	36.0
Balsam fir	145.8	115.9
Hemlock	74.9	65.0
Tamarack	23.2	26.8
Northern white-cedar	330.8	431.1
Other softwoods	--	28.4
Total	1,027.1	1,707.1
HARDWOODS		
Select white oak	211.4	251.2
Select red oak	404.2	721.4
Other red oak	255.9	180.2
Hickory	4.0	1.8
Yellow birch	40.9	37.6
Hard maple	464.5	693.0
Soft maple	341.9	748.3
Beech	158.1	121.7
Ash	189.2	251.9
Balsam poplar	81.1	98.1
Cottonwood	26.2	10.3
Bigtooth aspen	453.3	653.6
Quaking aspen	472.0	630.9
Basswood	225.9	325.2
Yellow-poplar	--	--
Black walnut	--	0.2
Black cherry	47.8	94.1
Butternut	--	0.3
Elm	297.6	30.1
Paper birch	233.6	257.0
Other hardwoods	10.3	10.7
Total	3,917.9	5,117.6
All species	4,945.0	6,824.7

[1/]Figures have been adjusted from those published after the 1966 survey to conform to 1980 areas because of changes in survey procedures and definitions.

Table 24.--Net volume of all live trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS													
White pine	181,415	10,943	15,199	15,553	18,400	20,864	22,629	22,028	17,044	10,652	23,508	4,120	475
Red pine	456,084	139,935	117,990	67,265	43,146	24,964	23,897	20,498	9,708	6,608	2,073	--	--
Jack pine	350,545	96,385	119,898	86,112	29,963	13,910	3,387	725	165	--	--	--	--
White spruce	39,280	7,678	6,958	8,978	6,020	4,339	2,389	1,266	775	699	178	--	--
Black spruce	36,475	13,295	14,103	6,664	1,492	659	262	--	--	--	--	--	--
Balsam fir	117,367	42,972	39,323	22,336	8,645	2,621	1,470	--	--	--	--	--	--
Hemlock	69,150	8,440	10,576	8,379	8,759	10,379	5,949	6,625	3,900	2,091	4,052	--	--
Tamarack	28,800	10,525	6,966	5,455	3,678	1,350	570	--	--	256	--	--	--
Northern white-cedar	479,790	167,257	146,110	89,676	41,174	22,826	8,047	2,603	1,752	345	--	--	--
Other softwoods	33,417	20,494	10,308	2,117	--	379	--	--	119	--	--	--	--
Total	1,792,323	517,924	487,431	312,535	161,277	102,291	68,600	53,745	33,463	20,651	29,811	4,120	475
HARDWOODS													
Select white oaks	270,861	45,274	57,409	51,614	44,651	23,332	18,585	12,171	7,760	4,981	3,774	1,310	--
Select red oaks	757,085	63,141	119,763	150,258	130,365	95,170	72,575	56,141	28,615	17,201	18,123	5,146	587
Other red oaks	197,094	24,471	35,975	40,244	31,364	21,936	15,007	15,258	4,505	3,357	4,264	713	--
Hickory	1,837	--	437	464	558	181	--	197	--	--	--	--	--
Yellow birch	43,334	7,941	8,090	9,678	7,652	3,632	3,431	1,663	520	445	282	--	--
Hard maple	726,600	172,450	170,631	140,909	91,496	61,276	38,204	20,173	12,128	6,142	10,854	2,151	186
Soft maple	790,223	157,908	177,826	156,309	112,416	71,245	44,484	28,642	19,383	7,815	10,715	2,143	1,337
Beech	149,085	18,106	17,814	18,906	14,425	20,358	16,860	16,328	11,071	6,912	7,258	1,047	--
Ash	266,091	61,387	56,273	52,687	39,530	26,601	15,361	7,845	2,587	1,210	1,621	697	292
Balsam poplar	104,094	8,207	14,531	14,339	16,229	17,196	14,743	8,836	5,404	3,084	926	599	--
Cottonwood	10,771	534	952	1,224	1,373	1,144	956	494	1,416	691	721	--	1,266
Bigtooth aspen	688,650	86,670	147,852	179,718	143,068	72,739	33,699	15,516	4,858	2,376	2,154	--	--
Quaking aspen	681,823	99,062	144,552	159,531	130,872	76,868	44,209	16,808	7,502	1,979	440	--	--
Basswood	335,574	36,296	61,293	84,758	61,812	43,613	23,673	13,312	5,411	2,574	2,223	609	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	200	--	--	200	--	--	--	--	--	--	--	--	--
Black cherry	117,002	21,744	29,214	26,019	14,425	13,921	6,858	1,884	1,679	1,134	124	--	--
Butternut	278	--	--	--	--	278	--	--	--	--	--	--	--
Elm	35,142	9,309	9,170	7,416	4,981	1,425	1,691	833	317	--	--	--	--
Paper birch	273,966	72,768	87,177	62,689	30,744	12,074	6,599	1,478	437	--	--	--	--
Other hardwoods	13,282	2,010	810	1,985	1,972	1,706	1,070	899	1,167	708	866	89	--
Noncommercial species	22,154	12,525	5,784	2,918	736	63	--	--	128	--	--	--	--
Total	5,485,146	899,803	1,145,553	1,161,866	878,669	564,758	358,005	218,478	114,888	60,609	64,345	14,504	3,668
All species	7,277,469	1,417,727	1,632,984	1,474,401	1,039,946	667,049	426,605	272,223	148,351	81,260	94,156	18,624	4,143

Table 25.--Net volume of timber on commercial forest land by class of timber and softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Class of timber	All species	Softwoods	Hardwoods
LIVE TREES			
Growing-stock trees			
Sawtimber			
Saw log portion	2,361,147	659,068	1,702,079
Upper stem portion	486,205	89,066	397,139
Subtotal	2,847,352	748,134	2,099,218
Poletimber	3,977,314	958,917	3,018,397
Total growing-stock	6,824,666	1,707,051	5,117,615
Cull trees			
Rough and rotten trees			
Sawtimber	143,444	24,913	118,531
Poletimber	231,359	46,440	184,919
Subtotal	374,803	71,353	303,450
Short-log trees	78,000	13,919	64,081
Total cull	452,803	85,271	367,532
TOTAL LIVE TREES	7,277,469	1,792,323	5,485,146
SALVABLE DEAD TREES	230,467	54,473	175,994
ALL CLASSES	7,507,936	1,846,796	5,661,140

Table 26.--Net volume of growing stock, sawtimber, short-log, and rough and rotten trees on commercial forest land by individual species, Northern Lower Peninsula, Michigan, 1980

Species	Total all live	Growing stock	Short-log cull	Rough and rotten cull	Sawtimber
	- - - - - - -	-Thousand cubic feet-		- - - - - - -	Thousand board feet[1/]
SOFTWOODS					
White pine	181,415	176,763	1,535	3,117	811,402
Red pine	456,084	452,495	260	3,329	1,053,736
Jack pine	350,545	335,918	1,959	12,668	684,828
Scotch pine	27,090	22,918	--	4,172	8,532
Austrian pine	5,667	4,850	--	817	1,315
White spruce	39,280	38,705	67	508	121,852
Norway spruce	281	281	--	--	--
Engelmann spruce	--	--	--	--	--
Black spruce	36,475	35,972	--	503	41,690
Balsam fir	117,367	115,899	132	1,336	151,930
Hemlock	69,150	64,960	835	3,355	252,871
Tamarack	28,800	26,795	332	1,673	56,260
Northern white-cedar	479,790	431,116	8,799	39,875	653,206
Eastern redcedar	379	379	--	--	1,800
Total	1,792,323	1,707,051	13,919	71,353	3,839,422
HARDWOODS					
White oak	264,746	245,910	4,919	13,917	555,386
Bur oak	3,098	2,505	314	279	6,291
Swamp white oak	2,906	2,745	--	161	10,517
Chestnut oak	112	--	--	112	--
Northern red oak	757,086	721,458	10,815	24,813	2,159,690
Scarlet oak	1,093	1,093	--	--	873
Northern pin oak	54,628	52,295	588	1,745	168,375
Black oak	141,372	126,801	1,342	13,229	318,854
Bitternut hickory	1,204	1,204	--	--	4,625
Shellbark hickory	--	--	--	--	--
Shagbark hickory	633	633	--	--	963
Yellow birch	43,334	37,604	1,325	4,405	77,578
Black maple	--	--	--	--	--
Sugar maple	726,599	692,984	9,176	24,439	1,188,575
Red maple	748,986	708,539	9,712	30,735	1,293,221
Silver maple	41,237	39,816	310	1,111	156,852
Beech	149,085	121,689	6,311	21,085	389,470
White ash	152,226	148,096	1,476	2,654	377,159
Black ash	82,344	74,255	234	7,855	59,151
Green ash	31,521	29,541	138	1,842	51,125
Honeylocust	559	466	--	93	--
Balsam poplar	104,094	98,083	465	5,546	353,766
Paper birch	273,966	256,960	2,117	14,889	233,758
Bigtooth aspen	688,651	653,639	5,006	30,006	1,339,410
Quaking aspen	681,824	630,943	5,383	45,498	1,366,066
Basswood	335,575	325,173	2,124	8,278	834,832
American elm	31,929	27,234	561	4,134	37,263
Slippery elm	896	807	--	89	1,089
Rock elm	2,315	2,077	135	103	5,778
American chestnut	296	110	--	186	--
Butternut	278	278	--	--	1,427
Red mulberry	97	97	--	--	--
Black tupelo	968	714	--	254	883
Sycamore	617	617	--	--	3,172
Black walnut	200	200	--	--	--
Black cherry	117,000	94,087	1,396	21,517	172,403
Boxelder	--	--	--	--	--
River birch	336	336	--	--	878
Eastern cottonwood	10,772	10,261	92	419	42,830
Black willow	7,076	6,385	142	549	25,904
Sassafras	3,333	1,980	--	1,353	4,596
Noncommercial species	22,154	--	--	22,154	--
Total	5,485,146	5,117,615	64,081	303,450	11,242,760
All species	7,277,469	6,824,666	78,000	374,803	15,082,182

[1/] International 1/4-inch rule.

Table 27.--Net volume of noncommercial species (nongrowing-stock volume) on commercial forest land by individual species, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species	Nongrowing-stock (rough tree) volume
Striped maple	263
Mountain maple	--
Ailanthus	--
American hornbeam	126
Eastern hophornbeam	17,891
Eastern redbud	--
Hawthorn	273
Apple	1,486
Pin cherry	560
Chokecherry	888
Mountain ash	81
Peachleaf willow	586
Diamond willow	--
All species	22,154

Table 28.--Net volume of growing stock on commercial forest land by species group and county, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	176,763	7,923	6,397	1,352	1,207	--	360	5,406	10,125	4,923	5,034	1,370
Red pine	452,495	17,447	5,509	509	665	--	9,031	4,289	17,727	10,518	20,959	1,879
Jack pine	335,918	15,092	2,388	--	4,813	--	--	868	11,429	14,777	48,354	--
White spruce	38,705	2,730	8,499	153	--	--	--	3,493	9,772	--	--	866
Black spruce	35,972	1,766	243	1,692	--	--	420	1,843	5,153	--	2,100	2,645
Balsam fir	115,899	8,659	15,464	2,681	1,853	--	359	5,405	13,870	1,872	2,305	5,897
Hemlock	64,960	900	523	4,118	--	--	3,219	2,335	3,019	240	906	2,926
Tamarack	26,795	142	1,002	299	360	--	1,385	914	2,283	1,574	389	2,176
Northern white-cedar	431,116	16,470	30,438	10,369	2,299	--	2,960	25,800	40,998	9,898	6,567	12,099
Other softwoods	28,428	141	137	1,608	1,946	--	2,102	--	78	--	47	--
Total	1,707,051	71,270	70,600	22,781	13,143	--	19,836	50,353	114,454	43,802	86,661	29,858
HARDWOODS												
Select white oaks	251,160	11,700	1,794	--	660	326	164	--	1,057	13,414	12,575	--
Select red oaks	721,458	63,031	20,206	--	8,389	101	814	2,808	10,198	29,945	57,480	5,729
Other red oaks	180,189	13,787	--	--	1,921	--	--	--	1,411	11,455	9,018	--
Hickory	1,838	--	--	--	--	--	--	--	--	197	--	--
Yellow birch	37,604	396	--	2,389	343	--	2,335	5,584	1,623	--	--	2,599
Hard maple	692,984	7,547	2,760	60,526	677	--	47,710	51,006	50,720	1,838	10,422	77,468
Soft maple	748,355	28,078	22,506	20,066	15,710	3,835	23,314	10,929	22,792	31,427	12,344	16,725
Beech	121,689	4,576	--	8,343	377	--	7,852	8,134	7,474	2,184	3,038	17,590
Ash	251,892	12,130	7,483	7,451	12,685	4,775	5,643	12,456	7,274	4,820	439	10,739
Balsam poplar	98,083	14,379	12,756	1,585	817	--	--	2,274	10,000	1,128	1,279	5,292
Cottonwood	10,261	--	--	--	775	881	--	--	--	443	--	--
Bigtooth aspen	653,639	30,198	39,926	24,528	17,136	4,125	5,753	10,043	33,839	25,756	15,528	25,662
Quaking aspen	630,943	28,576	28,402	10,063	17,839	1,842	7,359	14,611	47,920	22,183	11,759	31,025
Basswood	325,173	10,539	1,803	36,759	1,057	1,120	12,692	34,439	34,246	659	4,497	17,642
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	200	--	--	--	--	--	--	--	--	--	--	--
Black cherry	94,087	3,429	263	2,576	485	--	7,192	646	186	3,615	887	7,136
Butternut	278	--	--	--	--	--	--	--	--	--	--	--
Elm	30,117	387	329	4,438	660	197	261	1,821	2,008	78	169	657
Paper birch	256,960	13,080	20,610	2,983	5,404	2,360	2,666	18,177	20,802	5,533	3,040	8,866
Other hardwoods	10,705	319	--	--	804	--	--	--	162	311	110	--
Total	5,117,615	242,152	158,838	181,707	85,739	19,562	123,755	172,928	251,712	154,986	142,585	227,130
All species	6,824,666	313,422	229,438	204,488	98,882	19,562	143,591	223,281	366,166	198,788	229,246	256,988

(Table 28 continued on next page)

(Table 28 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	4,541	5,884	6,455	414	4,878	12,641	2,490	5,791	2,601	4,832	5,637	7,936
Red pine	2,212	17,848	39,979	387	23,237	41,847	2,165	19,430	9,876	3,135	2,557	6,257
Jack pine	1,996	6,966	24,882	--	14,151	24,498	--	7,580	6,353	359	114	2,805
White spruce	--	--	2,227	113	96	--	--	--	--	936	--	285
Black spruce	--	184	599	--	2,039	114	134	89	114	1	--	989
Balsam fir	1,053	--	4,415	--	4,930	165	261	274	164	1	--	2,772
Hemlock	199	3,448	2,047	1,972	2,033	2,903	1,602	1,854	1,297	2,662	1,234	884
Tamarack	--	3,612	2,196	350	108	8	596	1,046	5	--	--	1,023
Northern white-cedar	1,184	11,306	20,134	4,716	8,259	12,703	4,698	6,884	4,153	5,043	--	10,824
Other softwoods	--	423	43	2,428	1,151	2,900	--	440	3,332	568	--	2,448
Total	11,185	49,671	102,977	10,380	60,882	97,779	11,946	43,388	27,895	17,537	9,542	36,223
HARDWOODS												
Select white oaks	3,839	8,671	4,294	4,661	1,355	41,318	--	16,370	18,438	4,546	9,492	4,601
Select red oaks	11,357	11,265	11,195	8,098	14,330	58,479	3,315	21,201	18,351	5,456	11,289	21,958
Other red oaks	2,262	173	12,916	788	--	25,150	--	12,364	12,892	1,493	239	377
Hickory	171	154	--	--	--	--	--	--	--	152	350	--
Yellow birch	182	1,161	385	--	2,854	304	1,456	361	1,270	678	350	175
Hard maple	--	18,654	1,464	530	38,195	3,949	43,409	41,325	6,870	6,226	211	19,964
Soft maple	26,163	21,552	29,020	11,909	19,439	21,004	2,814	49,949	24,836	12,095	29,714	32,510
Beech	--	1,372	109	371	2,020	1,787	6,813	8,716	1,249	155	2,616	2,340
Ash	7,434	1,403	10,583	4,384	2,382	5,051	22,242	7,756	4,278	7,710	8,189	9,335
Balsam poplar	5,906	2,337	3,442	764	--	348	70	133	351	217	830	990
Cottonwood	482	--	1,492	610	--	--	--	--	--	--	1,206	198
Bigtooth aspen	34,365	16,506	16,219	14,798	9,912	20,258	1,889	6,838	16,447	23,621	29,781	21,801
Quaking aspen	42,665	19,628	16,769	9,651	11,615	14,644	501	15,009	12,760	10,346	19,140	18,444
Basswood	1,072	4,506	2,058	634	18,904	5,028	15,722	6,158	1,883	3,811	2,858	4,337
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	423	1,352	1,520	341	3,449	4,490	260	9,670	1,928	4,337	269	2,430
Butternut	--	--	--	106	--	--	--	--	--	--	--	--
Elm	1,681	517	455	120	1,701	1,155	901	472	771	1,269	504	510
Paper birch	11,877	5,995	7,935	2,963	3,346	2,745	1,266	4,752	1,762	4,585	8,538	9,313
Other hardwoods	320	--	2,915	182	--	237	--	466	264	--	367	212
Total	150,199	115,246	122,771	60,910	129,502	205,947	100,658	201,540	124,350	86,697	125,943	149,495
All species	161,384	164,917	225,748	71,290	190,384	303,726	112,604	244,928	152,245	104,234	135,485	185,718

(Table 28 continued on next page)

(Table 28 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	3,395	13,239	4,403	1,190	3,331	8,264	15,615	3,122	10,819	5,188
Red pine	14,673	33,538	6,878	2,559	--	31,212	16,139	11,670	21,190	57,173
Jack pine	19,221	9,427	1,840	18,738	632	45,739	9,488	10,838	19,502	13,068
White spruce	2,193	--	248	1,061	321	883	1,095	3,270	464	--
Black spruce	2,494	147	104	146	229	203	5,265	3,414	2,283	1,562
Balsam fir	4,807	211	150	3,393	2,529	4,276	5,001	16,023	5,811	1,298
Hemlock	1,228	3,803	4,343	393	8,252	15	1,570	1,923	294	2,818
Tamarack	2,201	894	174	3	431	70	352	1,830	998	374
Northern white-cedar	14,493	5,210	3,757	14,254	17,433	7,553	12,226	61,444	32,523	14,421
Other softwoods	1,175	2,402	1,289	8	162	141	--	190	--	3,269
Total	65,880	68,871	23,186	41,745	33,320	98,356	66,751	113,724	93,884	99,171
HARDWOODS										
Select white oaks	2,834	39,693	13,903	3,006	1,292	7,688	589	638	17,176	5,066
Select red oaks	36,715	49,687	19,316	42,497	17,475	38,852	10,756	16,444	78,341	16,380
Other red oaks	266	39,995	9,192	1,670	--	15,240	1,432	--	704	5,444
Hickory	--	633	--	--	181	--	--	--	--	--
Yellow birch	--	1,741	1,825	471	2,806	157	1,964	1,346	617	2,232
Hard maple	18,556	8,743	6,902	5,415	29,220	6,524	78,851	9,654	1,442	36,206
Soft maple	24,287	49,776	28,501	23,790	26,357	13,184	18,681	11,638	31,818	31,592
Beech	2,681	3,932	3,140	952	5,781	902	8,045	1,214	494	7,432
Ash	5,470	9,164	7,842	8,777	11,352	3,715	4,779	7,622	8,268	8,261
Balsam poplar	2,924	1,674	850	3,822	1,290	2,890	3,697	13,455	1,972	611
Cottonwood	--	252	3,547	--	375	--	--	--	--	--
Bigtooth aspen	16,296	19,658	9,505	43,513	19,093	20,234	17,492	16,299	29,820	16,800
Quaking aspen	24,094	14,200	7,758	25,509	25,153	27,353	18,030	35,165	26,591	14,339
Basswood	15,557	6,124	2,337	4,450	7,507	4,967	42,803	8,237	1,864	8,903
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	200
Black cherry	934	7,905	5,033	1,825	7,494	1,593	2,262	--	1,388	8,769
Butternut	--	172	--	--	--	--	--	--	--	--
Elm	402	665	448	384	429	--	3,210	821	--	2,697
Paper birch	12,697	1,639	2,679	18,852	6,937	6,791	6,776	17,735	11,310	2,946
Other hardwoods	--	2,412	1,277	173	174	--	--	--	--	--
Total	163,713	258,065	124,055	185,106	162,916	150,090	219,367	140,268	211,805	167,878
All species	229,593	326,936	147,241	226,851	196,236	248,446	286,118	253,992	305,689	267,049

Table 29.--Net volume of sawtimber on commercial forest land by species group and county, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	811,402	41,129	28,267	7,414	5,202	--	1,255	25,044	44,688	25,564	20,658	6,476
Red pine	1,053,736	53,659	25,006	1,063	3,680	--	--	14,378	65,438	14,619	73,930	2,256
Jack pine	684,828	47,405	4,344	--	8,825	--	--	2,276	20,651	27,530	100,801	--
White spruce	121,852	8,602	26,095	721	--	--	--	14,936	36,888	--	--	1,970
Black spruce	41,690	5,651	--	5,101	--	--	--	1,111	2,975	--	2,536	4,240
Balsam fir	151,930	15,509	26,505	4,755	--	--	--	3,803	17,187	1,453	1,298	8,127
Hemlock	252,871	5,165	1,953	20,178	--	--	15,694	8,540	13,349	844	5,038	14,947
Tamarack	56,260	--	2,506	493	1,969	--	3,167	833	4,069	4,833	1,467	--
Northern white-cedar	653,206	30,900	57,222	26,988	691	--	7,372	30,721	60,703	12,365	2,834	11,168
Other softwoods	11,647	668	--	643	538	--	660	--	--	--	222	--
Total	3,839,422	208,688	171,898	67,356	20,905	--	28,148	101,642	265,948	87,208	208,784	49,184
HARDWOODS												
Select white oaks	572,193	22,896	3,605	--	691	1,845	--	--	1,783	42,295	13,968	--
Select red oaks	2,159,690	160,912	48,141	--	22,745	--	3,756	11,494	30,142	112,577	105,148	22,032
Other red oaks	488,102	21,109	--	--	6,541	--	--	--	1,848	34,620	12,075	--
Hickory	5,588	--	--	--	--	--	--	--	--	1,224	--	--
Yellow birch	77,578	--	--	1,385	--	--	5,960	11,662	4,337	--	--	3,975
Hard maple	1,188,575	11,070	3,921	88,241	--	--	94,680	97,973	48,252	7,863	7,858	101,823
Soft maple	1,450,072	55,391	45,207	36,428	28,175	10,030	44,233	19,884	24,600	49,525	4,482	16,063
Beech	389,470	5,761	--	31,115	1,768	--	33,182	30,002	21,656	5,516	6,515	51,227
Ash	487,434	12,039	8,407	18,203	29,659	16,578	15,373	28,384	13,395	7,143	882	28,014
Balsam poplar	353,766	61,784	35,989	3,536	3,209	--	--	9,081	22,722	5,207	2,061	20,818
Cottonwood	42,830	--	--	--	4,362	4,039	--	--	--	2,085	--	--
Bigtooth aspen	1,339,410	48,001	91,389	51,630	36,335	11,280	17,036	30,652	61,771	61,966	22,958	94,267
Quaking aspen	1,366,066	74,630	63,795	19,062	34,578	3,006	12,951	56,993	129,876	42,130	8,361	79,461
Basswood	834,836	30,957	4,960	49,294	2,749	--	45,724	65,258	84,727	2,140	18,236	44,703
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	172,403	4,696	--	3,409	--	--	20,820	--	--	3,660	--	16,028
Butternut	1,427	--	--	--	--	--	--	--	--	--	--	--
Elm	44,130	--	--	4,483	--	--	717	3,967	1,150	--	--	--
Paper birch	233,758	8,117	14,795	3,555	5,112	--	6,237	41,504	18,981	5,440	1,829	12,656
Other hardwoods	35,432	1,531	--	--	3,169	--	--	--	878	1,068	--	--
Total	11,242,760	518,894	320,209	310,341	179,093	46,778	300,669	406,854	466,118	384,459	204,373	491,067
All species	15,082,182	727,582	492,107	377,697	199,998	46,778	328,817	508,496	732,066	471,667	413,157	540,251

(Table 29 continued on next page)

1/International 1/4-inch rule.

(Table 29 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	20,468	22,543	28,773	1,652	22,362	63,814	12,647	28,066	12,911	18,070	26,887	37,606
Red pine	10,630	32,216	90,685	695	59,707	65,377	--	25,495	15,165	9,288	8,749	8,294
Jack pine	7,623	17,805	51,272	--	30,174	31,919	--	4,737	8,907	1,111	--	9,550
White spruce	--	--	7,347	--	--	--	--	--	--	--	--	--
Black spruce	--	--	--	--	1,120	--	--	--	--	--	--	2,619
Balsam fir	2,287	--	7,585	--	8,628	--	--	--	--	--	--	3,887
Hemlock	1,074	9,902	11,041	7,377	6,400	5,238	7,079	3,055	5,086	11,816	5,598	399
Tamarack	--	7,171	8,864	1,815	--	46	1,184	5,162	27	1	--	4,582
Northern white-cedar	2,029	15,929	31,517	3,784	14,438	10,070	5,051	10,023	8,681	6,551	--	24,512
Other softwoods	--	--	202	1,242	--	777	--	--	2,992	--	--	719
Total	44,111	105,566	237,286	16,565	142,829	177,241	25,961	76,538	53,769	46,837	41,234	92,168
HARDWOODS												
Select white oaks	7,472	21,278	5,977	16,354	2,685	93,539	--	40,439	42,198	18,554	28,672	12,266
Select red oaks	29,582	42,368	24,342	38,637	41,312	186,086	15,594	78,062	73,218	22,488	43,854	89,577
Other red oaks	4,176	1,024	17,466	4,434	--	75,314	--	36,640	36,458	6,001	1,403	2,011
Hickory	950	--	--	--	--	--	--	--	--	--	1,314	--
Yellow birch	949	1,661	1,161	--	3,978	106	6,028	1	3,176	--	893	1,040
Hard maple	--	48,298	4,944	1,993	52,453	6,484	94,814	133,061	21,550	26,285	--	28,855
Soft maple	23,532	49,256	61,470	33,275	23,615	26,172	12,742	156,115	74,479	24,648	81,598	59,171
Beech	--	7,757	36	1,125	7,900	3,793	33,056	33,721	2,720	27	4,688	4,949
Ash	8,069	686	11,991	6,320	1,710	10,352	78,928	20,527	8,480	14,141	14,708	18,361
Balsam poplar	22,014	12,105	15,704	1,878	--	1,879	--	659	1,982	1,097	4,452	4,056
Cottonwood	1,591	--	8,047	3,270	--	--	--	--	--	--	6,249	1,052
Bigtooth aspen	93,490	34,233	29,560	21,089	18,112	31,732	5,057	12,426	16,483	61,662	41,068	33,059
Quaking aspen	86,778	52,686	41,553	14,486	19,787	32,771	2,111	28,140	22,118	14,996	31,838	32,974
Basswood	2,943	17,748	8,024	2,228	41,076	17,941	54,930	22,573	8,975	10,414	11,665	15,065
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	--	1,860	--	1,025	5,335	9,621	--	25,339	2,977	28	--	1,517
Butternut	--	--	--	453	--	--	--	--	--	--	--	--
Elm	889	2,403	1,089	--	1,934	2,120	1,061	1,559	1,950	2,002	--	794
Paper birch	1,913	3,759	6,041	--	5,647	2,819	4,417	12,416	531	6,460	2,872	10,812
Other hardwoods	1,526	--	13,806	890	--	--	--	--	--	--	883	1,089
Total	285,874	297,122	251,211	147,457	225,544	500,729	308,738	601,678	317,295	208,803	276,157	316,648
All species	329,985	402,688	488,497	164,022	368,373	677,970	334,699	678,216	371,064	255,640	317,391	408,816

(Table 29 continued on next page)

(Table 29 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	15,541	61,561	17,129	2,618	12,389	40,765	69,609	16,055	54,771	19,468
Red pine	44,952	45,589	9,402	12,379	--	92,177	47,832	45,729	92,722	82,624
Jack pine	51,010	12,172	3,130	32,201	2,465	109,352	22,597	16,111	48,423	12,437
White spruce	6,885	--	--	3,411	--	1,657	3,132	10,208	--	--
Black spruce	2,469	--	--	--	997	780	5,198	6,117	776	--
Balsam fir	7,058	--	--	2,161	2,777	6,532	6,714	19,238	5,359	1,067
Hemlock	5,217	10,508	13,789	1,185	36,241	79	8,368	8,017	434	9,260
Tamarack	--	3,220	46	--	1,060	--	2,010	132	1,533	70
Northern white-cedar	14,613	9,388	4,040	17,659	34,045	14,690	18,541	99,105	51,881	15,695
Other softwoods	727	1,549	--	38	--	670	--	--	--	--
Total	148,472	143,987	47,536	71,652	89,974	266,702	184,001	220,712	255,899	140,621
HARDWOODS										
Select white oaks	3,613	85,386	44,288	1,819	2,618	10,657	--	1,653	32,579	13,063
Select red oaks	99,204	183,569	71,628	81,192	60,799	123,785	38,683	37,206	186,523	75,034
Other red oaks	--	143,570	31,287	5,251	--	20,785	3,162	--	1,414	21,513
Hickory	--	963	--	--	1,137	--	--	--	--	--
Yellow birch	--	5,378	3,858	--	5,491	--	2,917	5,270	1,009	7,343
Hard maple	20,445	21,731	15,787	3,256	79,125	6,518	89,465	12,363	--	59,467
Soft maple	21,866	139,175	76,242	38,680	56,062	16,373	23,082	13,502	43,345	61,654
Beech	4,598	12,353	10,981	2,463	30,039	48	25,515	998	--	15,961
Ash	8,488	21,194	17,706	8,727	19,453	7,694	11,240	1,007	9,775	9,800
Balsam poplar	11,404	9,091	774	15,527	4,926	14,124	12,792	44,526	7,329	3,040
Cottonwood	--	1,289	8,658	--	2,188	--	--	--	--	--
Bigtooth aspen	34,756	31,220	13,498	79,464	57,321	37,465	46,556	30,833	57,657	25,384
Quaking aspen	55,483	22,731	16,054	62,153	90,348	41,249	20,506	58,359	67,189	26,913
Basswood	38,152	19,363	6,280	19,146	34,367	7,862	91,572	20,890	8,933	25,941
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Black cherry	1,535	16,803	15,563	--	22,309	2,044	1,215	--	--	16,619
Butternut	--	974	--	--	--	--	--	--	--	--
Elm	1,729	1,515	557	786	--	--	7,342	--	--	6,083
Paper birch	6,973	1,066	2,610	11,535	5,946	8,561	6,028	3,825	8,674	2,627
Other hardwoods	--	8,524	1,214	854	--	--	--	--	--	--
Total	308,246	725,895	336,985	330,853	472,129	297,165	380,075	230,432	424,427	370,442
All species	456,718	869,882	384,521	402,505	562,103	563,867	564,076	451,144	680,326	511,063

Table 30.--Net volume of growing stock on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS													
White pine	176,763	10,453	14,519	14,794	17,203	20,404	22,136	22,028	17,044	10,484	23,103	4,120	475
Red pine	452,495	138,132	117,226	66,798	42,867	24,964	23,897	20,302	9,628	6,608	2,073	--	--
Jack pine	335,918	90,320	116,503	83,539	29,617	11,863	3,186	725	165	--	--	--	--
White spruce	38,705	7,301	6,958	8,842	6,020	4,277	2,389	1,266	775	699	178	--	--
Black spruce	35,972	13,101	13,877	6,664	1,409	659	262	--	--	--	--	--	--
Balsam fir	115,899	42,614	38,623	22,061	8,510	2,621	1,470	--	--	--	--	--	--
Hemlock	64,960	7,483	9,914	7,844	8,340	9,645	5,670	6,376	3,900	2,001	3,787	--	--
Tamarack	26,795	9,553	6,412	5,114	3,618	1,272	570	--	--	256	--	--	--
Northern white-cedar	431,116	155,248	134,585	77,176	34,843	19,137	6,712	1,939	1,131	345	--	--	--
Other softwoods	28,428	17,143	8,950	1,837	--	379	--	--	119	--	--	--	--
Total	1,707,051	491,348	467,567	294,669	152,427	95,221	66,292	52,636	32,762	20,393	29,141	4,120	475
HARDWOODS													
Select white oaks	251,160	41,083	55,702	49,400	41,999	21,498	17,060	10,746	7,010	3,626	2,418	618	--
Select red oaks	721,458	60,607	116,100	142,530	122,570	89,945	70,262	53,276	27,611	16,472	17,196	4,302	587
Other red oaks	180,189	20,382	31,840	37,147	29,496	20,270	14,327	14,697	4,355	3,169	3,793	713	--
Hickory	1,838	--	437	465	558	181	--	197	--	--	--	--	--
Yellow birch	37,604	7,259	7,479	8,487	6,181	2,999	2,754	1,546	336	351	212	--	--
Hard maple	692,984	168,489	163,941	135,865	87,024	58,040	36,103	18,554	10,665	5,635	7,468	1,014	186
Soft maple	748,355	153,028	171,758	147,951	105,780	66,589	40,485	26,590	17,877	6,257	9,132	1,571	1,337
Beech	121,689	16,507	16,053	16,658	11,720	16,564	13,846	12,671	8,556	5,173	3,304	637	--
Ash	251,892	56,407	53,025	51,157	37,500	25,651	14,793	7,556	2,485	1,210	1,411	697	--
Balsam poplar	98,083	7,904	13,829	13,686	14,962	15,949	13,626	8,376	5,404	2,955	793	599	--
Cottonwood	10,261	389	952	1,224	1,373	1,145	956	357	1,416	462	721	--	1,266
Bigtooth aspen	653,639	79,938	142,775	175,906	135,683	68,622	28,948	14,398	4,432	1,436	1,501	--	--
Quaking aspen	630,943	89,431	136,923	151,815	122,263	69,949	39,124	14,306	5,864	1,061	207	--	--
Basswood	325,173	34,317	59,618	83,628	60,191	42,404	22,860	12,969	4,628	2,180	1,769	609	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	200	--	--	200	--	--	--	--	--	--	--	--	--
Black cherry	94,087	14,777	23,749	21,470	12,377	12,360	5,156	1,770	1,377	927	124	--	--
Butternut	278	--	--	--	--	278	--	--	--	--	--	--	--
Elm	30,117	8,004	7,968	5,850	4,748	995	1,559	833	160	--	--	--	--
Paper birch	256,960	67,959	82,945	59,593	27,535	11,107	6,292	1,234	295	--	--	--	--
Other hardwoods	10,705	1,288	691	1,811	1,456	1,399	947	757	1,045	610	701	--	--
Total	5,117,615	827,769	1,085,785	1,104,843	823,416	525,945	329,098	200,833	103,516	51,524	50,750	10,760	3,376
All species	6,824,666	1,319,117	1,553,352	1,399,512	975,843	621,166	395,390	253,469	136,278	71,917	79,891	14,880	3,851

Table 31.--Net volume of sawtimber on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS											
White pine	811,402	71,567	85,977	104,604	116,391	118,667	93,937	58,860	133,519	24,830	3,050
Red pine	1,053,736	334,138	235,870	141,930	134,491	112,248	51,469	33,685	9,905	--	--
Jack pine	684,828	438,451	162,057	63,635	16,540	3,394	751	--	--	--	--
White spruce	121,852	42,579	29,163	21,184	12,537	6,870	4,339	4,096	1,084	--	--
Black spruce	41,690	29,174	7,078	3,589	1,849	--	--	--	--	--	--
Balsam fir	151,930	91,541	39,883	12,912	7,594	--	--	--	--	--	--
Hemlock	252,871	34,416	41,071	50,923	32,324	36,327	23,335	11,800	22,675	--	--
Tamarack	56,260	24,450	18,764	6,868	4,254	--	--	1,924	--	--	--
Northern white-cedar	653,206	352,951	161,604	89,348	32,531	9,070	5,953	1,749	--	--	--
Other softwoods	11,647	9,309	--	1,800	--	--	538	--	--	--	--
Total	3,839,422	1,428,576	781,467	496,793	358,511	286,576	180,322	112,114	167,183	24,830	3,050
HARDWOODS											
Select white oaks	572,193	--	220,244	117,414	95,532	61,914	40,776	19,772	13,185	3,356	--
Select red oaks	2,159,690	--	600,492	476,204	392,774	306,342	161,766	96,851	99,193	23,257	2,811
Other red oaks	488,102	--	143,574	108,126	80,335	85,526	25,525	18,878	22,097	4,041	--
Hickory	5,588	--	3,227	1,137	--	1,224	--	--	--	--	--
Yellow birch	77,578	--	32,856	17,005	14,426	8,468	1,877	1,976	970	--	--
Hard maple	1,188,575	--	437,852	314,120	198,270	103,791	59,082	30,604	38,890	5,136	830
Soft maple	1,450,072	--	556,724	352,487	213,700	139,777	94,110	31,525	46,500	8,228	7,021
Beech	389,470	--	56,915	90,529	79,415	71,797	47,771	26,356	14,474	2,213	--
Ash	487,434	--	191,058	137,431	82,251	43,927	14,209	6,932	8,130	3,496	--
Balsam poplar	353,766	--	97,126	92,359	72,777	43,270	26,330	15,319	3,889	2,696	--
Cottonwood	42,830	--	7,774	6,386	5,327	2,069	7,975	2,407	4,087	--	6,805
Bigtooth aspen	1,339,410	--	679,717	373,074	163,149	83,321	24,717	8,025	7,407	--	--
Quaking aspen	1,366,066	--	625,697	389,928	226,068	83,572	33,978	5,720	1,103	--	--
Basswood	834,836	--	332,136	241,910	132,519	74,761	27,347	13,437	10,048	2,678	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	172,403	--	59,353	67,988	27,184	8,415	5,685	3,419	359	--	--
Butternut	1,427	--	--	1,427	--	--	--	--	--	--	--
Elm	44,130	--	24,050	5,742	8,809	4,532	997	--	--	--	--
Paper birch	233,758	--	137,443	55,984	31,551	7,092	1,688	--	--	--	--
Other hardwoods	35,432	--	7,239	7,365	4,605	3,773	5,407	3,311	3,732	--	--
Total	11,242,760	--	4,213,477	2,856,616	1,828,692	1,133,571	579,240	284,532	274,064	55,101	17,467
All species	15,082,182	1,428,576	4,994,944	3,353,409	2,187,203	1,420,147	759,562	396,646	441,247	79,931	20,517

[1/] International 1/4-inch rule.

Table 32.--Net volume of growing stock on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All types	Forest type						
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	176,763	5,461	14,598	50,226	2,745	221	1,325	13,227
Red pine	452,495	32,916	323,456	10,502	538	--	--	1,435
Jack pine	335,918	237,410	37,194	2,304	--	--	--	--
White spruce	38,705	--	1,368	1,731	3,744	6,799	239	14,305
Black spruce	35,972	737	484	1,109	1,478	132	6,554	21,520
Balsam fir	115,899	147	743	1,806	16,572	3,247	972	37,565
Hemlock	64,960	--	1,337	--	--	--	--	6,275
Tamarack	26,795	108	--	--	276	--	183	15,061
Northern white-cedar	431,116	--	721	1,035	4,375	3,391	3,264	285,596
Other softwoods	28,428	--	2,094	3,780	--	--	--	1,029
Total	1,707,051	276,779	381,995	72,493	29,728	13,790	12,537	396,013
HARDWOODS								
Select white oaks	251,160	2,782	7,331	3,899	--	--	--	--
Select red oaks	721,458	27,976	13,359	4,612	--	--	--	--
Other red oaks	180,189	12,982	10,949	--	--	--	--	--
Hickory	1,838	--	--	--	--	--	--	--
Yellow birch	37,604	--	--	377	--	--	--	2,343
Hard maple	692,984	145	1,066	--	160	--	--	533
Soft maple	748,355	3,105	6,982	2,329	2,772	199	90	18,806
Beech	121,689	--	515	--	--	--	--	--
Ash	251,892	--	278	--	472	--	--	13,832
Balsam poplar	98,083	--	--	--	616	1,623	561	14,930
Cottonwood	10,261	--	--	--	--	--	--	--
Bigtooth aspen	653,639	1,796	6,384	2,709	200	215	--	4,276
Quaking aspen	630,943	8,304	7,752	3,987	8,080	740	778	13,491
Basswood	325,173	464	712	--	--	--	--	1,424
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	200	--	200	--	--	--	--	--
Black cherry	94,087	260	1,552	301	284	--	79	357
Butternut	278	--	--	--	--	--	--	--
Elm	30,117	144	--	95	--	--	--	899
Paper birch	256,960	282	804	1,347	6,935	77	501	30,865
Other hardwoods	10,705	--	--	--	--	--	--	336
Total	5,117,615	58,240	57,884	19,656	19,519	2,854	2,009	102,092
All species	6,824,666	335,019	439,879	92,149	49,247	16,644	14,546	498,105

(Table 32 continued on next page)

(Table 32 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	610	14,664	9,965	34,490	27,642	1,510	79	--
Red pine	--	25,314	1,990	17,237	33,171	1,681	4,074	181
Jack pine	570	39,803	--	7,431	10,527	--	505	174
White spruce	--	--	1,193	785	7,934	607	--	--
Black spruce	1,155	156	1,198	62	1,243	144	--	--
Balsam fir	396	1,651	7,075	4,572	37,363	3,650	--	140
Hemlock	--	583	3,766	46,973	4,512	1,514	--	--
Tamarack	6,315	--	1,683	1,552	896	721	--	--
Northern white-cedar	1,572	402	32,271	25,851	62,779	9,750	109	--
Other softwoods	--	379	--	1,755	256	--	19,135	--
Total	10,618	82,952	59,141	140,708	186,323	19,577	23,902	495
HARDWOODS								
Select white oaks	--	200,397	4,247	15,465	16,370	669	--	--
Select red oaks	--	469,108	3,172	95,874	103,439	3,125	635	158
Other red oaks	--	145,015	545	4,859	5,839	--	--	--
Hickory	--	--	--	1,667	--	171	--	--
Yellow birch	--	418	5,976	25,548	1,500	1,316	126	--
Hard maple	--	3,682	4,508	658,610	21,037	2,800	443	--
Soft maple	88	69,010	165,707	302,865	162,842	12,750	415	395
Beech	--	1,535	494	112,461	6,133	551	--	--
Ash	248	5,856	69,503	132,750	23,438	5,148	92	275
Balsam poplar	302	273	9,132	3,617	64,812	1,802	415	--
Cottonwood	--	--	5,986	1,814	2,461	--	--	--
Bigtooth aspen	--	88,144	5,552	103,706	436,344	4,313	--	--
Quaking aspen	176	15,250	28,237	94,734	437,473	11,352	589	--
Basswood	--	2,502	10,572	291,107	14,555	3,400	437	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	5,966	3,219	66,895	14,210	158	494	312
Butternut	--	106	--	172	--	--	--	--
Elm	--	139	5,546	20,072	2,603	506	113	--
Paper birch	551	11,153	18,110	53,155	81,625	51,555	--	--
Other hardwoods	--	1,542	3,788	2,764	2,101	174	--	--
Total	1,365	1,020,096	344,294	1,988,135	1,396,782	99,790	3,759	1,140
All species	11,983	1,103,048	403,435	2,128,843	1,583,105	119,367	27,661	1,635

Table 33.--Net volume of sawtimber on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	811,402	24,591	56,156	252,395	13,250	1,160	7,009	68,328
Red pine	1,053,736	116,536	577,495	53,608	2,060	--	--	7,673
Jack pine	684,828	459,690	68,568	8,867	--	--	--	--
White spruce	121,852	--	3,508	5,353	12,766	17,275	549	47,795
Black spruce	41,690	1,120	--	2,278	2,641	--	3,707	24,931
Balsam fir	151,930	--	--	3,914	24,628	5,059	923	44,309
Hemlock	252,871	--	3,740	--	--	--	--	28,462
Tamarack	56,260	--	--	--	--	--	796	23,216
Northern white-cedar	653,206	--	633	1,401	11,157	5,669	4,398	410,678
Other softwoods	11,647	--	1,243	777	--	--	--	--
Total	3,839,422	601,937	711,343	328,593	66,502	29,163	17,382	655,392
HARDWOODS								
Select white oaks	572,193	7,720	23,913	19,367	--	--	--	--
Select red oaks	2,159,690	67,098	54,405	13,333	--	--	--	--
Other red oaks	488,102	29,398	32,580	--	--	--	--	--
Hickory	5,588	--	--	--	--	--	--	--
Yellow birch	77,578	--	--	1,076	--	--	--	5,971
Hard maple	1,188,575	--	1,786	--	--	--	--	645
Soft maple	1,450,072	3,609	11,664	1,730	9,670	--	--	38,220
Beech	389,470	--	2,855	--	--	--	--	--
Ash	487,434	--	686	--	--	--	--	4,757
Balsam poplar	353,766	--	--	--	1,148	8,302	--	50,519
Cottonwood	42,830	--	--	--	--	--	--	--
Bigtooth aspen	1,339,410	2,460	7,453	5,456	1,151	1,235	--	15,977
Quaking aspen	1,366,066	4,399	838	2,766	21,554	--	1,359	50,351
Basswood	834,836	1,212	2,317	--	--	--	--	4,880
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	172,403	--	1,633	--	--	--	--	--
Butternut	1,427	--	--	--	--	--	--	--
Elm	44,130	--	--	--	--	--	--	1,834
Paper birch	233,758	--	1,672	1,708	8,062	--	957	22,733
Other hardwoods	35,432	--	--	--	--	--	--	878
Total	11,242,760	115,896	141,802	45,436	41,585	9,537	2,316	196,765
All species	15,082,182	717,833	853,145	374,029	108,087	38,700	19,698	852,157

[1/] International 1/4-inch rule.

(Table 33 continued on next page)

(Table 33 continued)

Species group	Forest type							
	Tamarack	Oak hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	2,292	59,109	51,672	142,963	126,351	5,618	508	--
Red pine	--	75,714	9,742	56,902	146,029	6,969	--	1,008
Jack pine	2,506	91,674	--	20,447	30,042	--	2,408	626
White spruce	--	--	5,525	2,854	25,443	784	--	--
Black spruce	3,974	--	675	--	2,364	--	--	--
Balsam fir	--	2,132	8,239	4,193	56,222	2,311	--	--
Hemlock	--	1,677	9,144	192,307	14,088	3,453	--	--
Tamarack	12,424	--	4,827	8,095	4,933	1,969	--	--
Northern white-cedar	2,837	1,324	51,853	55,539	97,450	10,267	--	--
Other softwoods	--	1,800	--	2,193	538	--	5,096	--
Total	24,033	233,430	141,677	485,493	503,460	31,371	8,012	1,634
HARDWOODS								
Select white oaks	--	403,444	13,804	52,410	48,559	2,976	--	--
Select red oaks	--	1,301,499	9,093	387,305	313,808	11,263	972	914
Other red oaks	--	386,367	1,463	20,810	17,484	--	--	--
Hickory	--	--	--	4,638	--	950	--	--
Yellow birch	--	949	11,889	54,197	1,854	883	759	--
Hard maple	--	4,224	9,530	1,144,503	22,515	3,905	1,467	--
Soft maple	--	69,511	531,425	571,923	191,217	17,948	1,556	1,599
Beech	--	2,394	1,854	376,731	5,198	438	--	--
Ash	--	10,449	108,118	341,054	19,989	1,905	476	--
Balsam poplar	1,763	1,150	38,736	15,759	229,634	6,755	--	--
Cottonwood	--	--	23,028	8,097	11,705	--	--	--
Bigtooth aspen	--	143,483	12,056	263,638	874,115	12,386	--	--
Quaking aspen	--	15,859	76,398	234,521	939,463	18,558	--	--
Basswood	--	1,996	32,672	748,808	31,015	11,936	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	9,829	6,426	130,023	22,735	--	1,757	--
Butternut	--	453	--	974	--	--	--	--
Elm	--	--	6,739	33,252	2,305	--	--	--
Paper birch	773	12,733	25,454	72,416	59,145	28,105	--	--
Other hardwoods	--	4,913	15,469	9,932	3,357	883	--	--
Total	2,536	2,369,253	924,154	4,470,991	2,794,098	118,891	6,987	2,513
All species	26,569	2,602,683	1,065,831	4,956,484	3,297,558	150,262	14,999	4,147

Table 34.--Net volume of growing stock on commercial forest land by species group and ownership class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	176,763	8,964	--	--	--	55,688	935	1,584	24,202	30,097	55,293
Red pine	452,495	189,513	--	101	--	128,590	1,860	4,200	44,723	20,878	62,630
Jack pine	335,918	103,229	--	783	--	137,140	1,697	1,309	20,090	9,475	62,195
White spruce	38,705	--	--	--	--	7,322	788	334	13,214	5,513	11,534
Black spruce	35,972	977	--	--	--	17,235	--	156	7,238	991	9,375
Balsam fir	115,899	8,455	--	--	--	29,015	914	751	29,863	10,254	36,647
Hemlock	64,960	1,074	--	--	--	9,120	290	264	28,640	2,873	22,699
Tamarack	26,795	408	--	--	--	8,454	--	1,088	4,599	1,457	10,789
Northern white-cedar	431,116	24,272	--	--	--	118,421	1,636	6,112	115,261	25,650	139,764
Other softwoods	28,428	379	--	--	--	489	--	--	14,344	2,231	10,985
Total	1,707,051	337,271	--	884	--	511,474	8,120	15,798	302,174	109,419	421,911
HARDWOODS											
Select white oaks	251,160	62,048	--	298	--	49,746	1,256	1,515	17,441	27,404	91,452
Select red oaks	721,458	39,538	--	74	--	218,228	4,511	7,569	92,702	78,099	280,737
Other red oaks	180,189	123,580	--	414	--	10,994	2,819	1,487	7,776	4,264	28,855
Hickory	1,838	--	--	--	--	--	--	--	1,317	--	521
Yellow birch	37,604	1,112	--	--	--	6,188	--	720	13,615	1,058	14,911
Hard maple	692,984	18,900	--	--	--	132,820	1,882	1,753	270,133	30,527	236,969
Soft maple	748,355	59,520	--	--	--	180,304	6,643	18,701	137,803	70,860	274,524
Beech	121,689	6,759	--	--	--	19,357	2,084	1,179	44,519	8,889	38,902
Ash	251,892	14,040	--	--	--	40,123	1,161	5,233	68,387	19,751	103,197
Balsam poplar	98,083	3,298	--	--	--	19,941	118	1,881	28,048	10,504	34,293
Cottonwood	10,261	--	--	--	--	721	--	1,266	1,222	854	6,198
Bigtooth aspen	653,639	47,407	--	--	--	169,966	7,361	6,394	113,192	50,339	258,980
Quaking aspen	630,943	44,600	--	3,287	--	158,196	3,161	6,145	125,556	47,568	242,430
Basswood	325,173	9,885	--	--	--	88,713	--	2,404	96,007	18,893	109,271
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	200	--	--	--	--	--	--	--	--	--	200
Black cherry	94,087	12,609	--	--	--	17,936	236	386	30,210	5,458	27,252
Butternut	278	--	--	--	--	--	--	--	278	--	--
Elm	30,117	2,925	--	--	--	7,380	--	280	6,900	1,413	11,219
Paper birch	256,960	8,610	--	--	--	71,825	248	5,621	57,479	18,835	94,342
Other hardwoods	10,705	--	--	--	--	336	--	212	3,542	521	6,094
Total	5,117,615	454,831	--	4,073	--	1,192,774	31,480	62,746	1,116,127	395,237	1,860,347
All species	6,824,666	792,102	--	4,957	--	1,704,248	39,600	78,544	1,418,301	504,656	2,282,258

Table 35.--Net volume of sawtimber on commercial forest land by species group and ownership class, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	811,402	44,532	--	--	--	260,097	3,921	6,153	108,894	145,067	242,738
Red pine	1,053,736	301,451	--	--	--	437,303	7,854	14,504	76,449	41,238	174,937
Jack pine	684,828	205,686	--	550	--	274,175	--	4,290	51,475	36,286	112,366
White spruce	121,852	--	--	--	--	19,978	2,424	904	47,647	18,692	32,207
Black spruce	41,690	--	--	--	--	10,042	--	597	6,872	2,755	21,424
Balsam fir	151,930	7,974	--	--	--	33,215	3,100	2,332	38,990	19,848	46,471
Hemlock	252,871	3,423	--	--	--	31,055	--	1,180	114,843	11,210	91,160
Tamarack	56,260	319	--	--	--	9,862	--	1,971	9,325	5,877	28,906
Northern white-cedar	653,206	25,522	--	--	--	170,977	2,783	4,181	158,620	39,860	251,263
Other softwoods	11,647	1,800	--	--	--	--	--	--	7,766	660	1,421
Total	3,839,422	590,707	--	550	--	1,246,704	20,082	36,112	620,881	321,493	1,002,893
HARDWOODS											
Select white oaks	572,193	126,210	--	--	--	103,632	1,972	4,086	52,188	81,329	202,776
Select red oaks	2,159,690	114,781	--	--	--	556,147	19,510	20,890	329,176	243,196	875,990
Other red oaks	488,102	311,226	--	--	--	26,551	1,104	6,670	18,684	12,388	111,479
Hickory	5,588	--	--	--	--	--	--	--	3,324	--	2,264
Yellow birch	77,578	554	--	--	--	10,761	--	2,141	32,463	2,827	28,832
Hard maple	1,188,575	10,486	--	--	--	158,956	3,277	1,111	547,014	57,151	410,580
Soft maple	1,450,072	95,868	--	--	--	298,381	9,008	45,884	292,127	184,180	524,624
Beech	389,470	9,020	--	--	--	56,554	7,034	5,675	145,661	25,599	139,927
Ash	487,434	13,189	--	--	--	71,071	1,518	11,555	149,552	38,297	202,252
Balsam poplar	353,766	16,924	--	--	--	55,707	--	6,279	98,215	49,792	126,849
Cottonwood	42,830	--	--	--	--	4,087	--	6,805	5,630	4,720	21,588
Bigtooth aspen	1,339,410	60,064	--	--	--	343,214	20,292	17,368	270,233	112,179	516,060
Quaking aspen	1,366,066	83,513	--	--	--	337,515	2,225	13,799	295,326	102,098	531,090
Basswood	834,836	18,131	--	--	--	195,397	--	12,005	253,191	57,964	298,148
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	172,403	14,653	--	--	--	35,825	716	1,069	65,945	5,311	48,884
Butternut	1,427	--	--	--	--	--	--	--	1,427	--	--
Elm	44,130	8,444	--	--	--	6,825	--	829	12,684	1,548	13,800
Paper birch	233,758	10,141	--	--	--	76,779	--	2,948	56,888	16,412	70,590
Other hardwoods	35,432	--	--	--	--	1,761	--	1,090	8,628	2,016	21,937
Total	11,242,760	893,204	--	--	--	2,339,163	66,656	160,204	2,638,856	997,007	4,147,670
All species	15,082,182	1,483,911	--	550	--	3,585,867	86,738	196,316	3,259,737	1,318,500	5,150,563

[1/]International 1/4-inch rule.

Table 36.--Net volume of growing stock on commercial forest land by forest type and stand-age class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	335,019	10,699	25,951	19,827	70,130	94,854	49,854	20,635	32,445	5,716	2,363	1,667	878	--
Red pine	439,879	3,322	30,795	156,972	109,852	61,263	6,339	19,621	11,573	16,590	13,300	10,252	--	--
White pine	92,149	586	5,727	3,780	--	7,306	10,928	1,603	12,356	15,768	22,585	2,797	8,713	--
Balsam fir	49,247	--	6,487	866	--	3,587	6,672	12,918	2,016	4,712	--	2,215	9,774	--
White spruce	16,644	817	3,570	--	--	--	1,227	--	--	6,913	--	--	--	4,117
Black spruce	14,546	1,047	1,570	--	--	5,429	2,623	293	3,584	--	--	--	--	--
Northern white-cedar	498,105	4,511	3,198	8,514	6,667	16,989	57,642	73,609	67,405	83,260	54,252	71,151	24,597	26,310
Tamarack	11,983	580	1,978	2,230	805	--	2,770	1,955	661	--	--	1,004	--	--
Oak-hickory	1,103,048	37,940	24,474	9,378	49,592	128,522	269,432	202,655	93,602	87,562	76,111	96,799	24,798	2,183
Elm-ash-soft maple	403,435	23,193	16,515	7,161	35,480	50,207	44,822	56,294	45,097	35,481	22,457	44,122	22,606	--
Maple-birch	2,128,843	55,868	53,029	35,198	124,020	412,646	463,400	262,265	180,891	227,655	131,439	145,829	36,603	--
Aspen	1,583,105	113,319	132,663	47,119	137,411	274,680	318,565	202,635	150,568	80,073	54,249	58,128	13,695	--
Paper birch	119,367	3,433	1,359	1,637	12,134	11,254	41,232	31,926	12,726	77	3,589	--	--	--
Exotic	27,661	269	3,704	11,291	8,940	2,130	1,327	--	--	--	--	--	--	--
Nonstocked	1,635	98	311	247	--	350	332	--	--	297	--	--	--	--
All types	6,824,666	255,682	311,331	304,220	555,031	1,069,217	1,277,165	886,409	612,924	564,104	380,345	433,964	141,664	32,610

Table 37.--Net volume of sawtimber on commercial forest land by forest type and stand-age class, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Forest type	All classes	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Jack pine	717,833	16,918	42,065	22,641	158,833	178,242	103,647	56,808	98,156	22,350
Red pine	853,145	3,604	40,331	139,440	205,870	129,246	28,175	79,190	48,794	67,572
White pine	374,029	1,338	25,212	777	--	17,788	39,959	7,100	48,752	73,214
Balsam fir	108,087	--	8,260	2,556	--	4,943	8,973	27,489	2,044	14,904
White spruce	38,700	--	7,919	--	--	--	1,838	--	--	18,039
Black spruce	19,698	957	4,894	--	--	10,005	1,378	--	2,464	--
Northern white-cedar	852,157	2,537	3,703	11,236	2,982	30,571	72,464	84,954	68,391	118,767
Tamarack	26,569	--	6,257	5,110	--	--	3,369	5,378	3,633	--
Oak-hickory	2,602,683	96,003	63,144	18,227	79,886	239,086	385,711	403,050	250,411	291,097
Elm-ash-soft maple	1,065,831	49,475	25,752	12,396	69,553	76,965	108,189	138,618	130,655	136,640
Maple-birch	4,956,484	124,906	120,457	48,791	213,596	650,762	733,435	662,554	515,168	718,174
Aspen	3,297,558	178,436	218,372	71,333	207,636	423,761	575,937	502,570	434,962	251,096
Paper birch	150,262	4,262	--	--	11,279	18,865	51,653	36,302	17,953	38
Exotic	14,999	--	4,393	972	5,840	660	3,134	--	--	--
Nonstocked	4,147	--	--	--	--	1,542	1,541	--	--	1,064
All types	15,082,182	478,436	570,759	333,479	955,475	1,782,436	2,119,403	2,004,013	1,621,383	1,712,955

(Table continued)

[1/] International 1/4-inch rule.

(Table 37 continued)

Stand-age class (years) 91-100	101-120	121-140	141+
10,400	5,119	2,654	--
64,582	46,341	--	--
102,070	12,801	45,018	--
--	7,373	31,545	--
--	--	--	10,904
--	--	--	--
127,252	182,513	73,791	72,996
--	2,822	--	--
298,464	369,123	98,667	9,814
66,511	175,885	75,192	--
453,474	557,561	157,606	--
182,038	205,101	46,316	--
9,910	--	--	--
--	--	--	--
--	--	--	--
1,314,701	1,564,639	530,789	93,714

Table 38.--Net volume of growing stock on commercial forest land by forest type, stand-size class, and basal-area class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)						
		0-10	11-20	21-30	31-40	41-50	51-60	61-70
Jack pine								
Sawtimber	71,306	--	--	1,956	3,917	6,025	4,031	19,144
Poletimber	211,658	--	--	2,018	2,115	29,811	9,151	26,287
Sapling & seedling	52,055	241	1,322	1,667	7,327	8,322	10,303	9,378
All stands	335,019	241	1,322	5,641	13,359	44,158	23,485	54,809
Red pine								
Sawtimber	103,151	--	--	--	3,429	5,051	--	8,728
Poletimber	302,514	--	--	--	1,238	1,517	3,461	5,377
Sapling & seedling	34,214	693	164	575	78	872	11,838	3,173
All stands	439,879	693	164	575	4,745	7,440	15,299	17,278
White pine								
Sawtimber	75,549	--	--	--	1,603	2,507	--	8,125
Poletimber	10,287	--	--	--	--	--	1,677	1,648
Sapling & seedling	6,313	--	--	1,056	--	1,453	1,914	1,890
All stands	92,149	--	--	1,056	1,603	3,960	3,591	11,663
Balsam fir								
Sawtimber	21,315	--	--	--	--	--	3,397	--
Poletimber	20,579	--	--	--	--	2,958	1,505	1,469
Sapling & seedling	7,353	--	325	--	--	3,016	--	--
All stands	49,247	--	325	--	--	5,974	4,902	1,469
White spruce								
Sawtimber	7,882	--	--	--	--	--	--	--
Poletimber	4,375	--	--	--	--	--	--	--
Sapling & seedling	4,387	--	--	--	817	--	--	--
All stands	16,644	--	--	--	817	--	--	--
Black spruce								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	11,636	--	--	710	--	--	--	2,026
Sapling & seedling	2,910	47	1,451	--	517	--	--	602
All stands	14,546	47	1,451	710	517	--	--	2,628
Northern white-cedar								
Sawtimber	156,047	--	--	--	--	--	--	2,002
Poletimber	327,142	--	--	--	774	--	2,147	2,660
Sapling & seedling	14,916	--	255	--	--	382	--	1,294
All stands	498,105	--	255	--	774	382	2,147	5,956

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70
Tamarack								
Sawtimber	3,621	--	--	661	1,004	--	--	--
Poletimber	4,747	--	--	--	--	--	--	919
Sapling & seedling	3,615	--	--	1,037	--	--	--	1,350
All stands	11,983	--	--	1,698	1,004	--	--	2,269
Oak-hickory								
Sawtimber	359,955	255	--	740	4,456	14,103	15,836	39,807
Poletimber	677,859	--	270	--	2,158	24,757	51,998	66,197
Sapling & seedling	65,234	875	7,532	6,877	10,233	17,052	10,414	9,114
All stands	1,103,048	1,130	7,802	7,617	16,847	55,912	78,248	115,118
Elm-ash-soft maple								
Sawtimber	190,532	--	--	1,460	4,039	10,254	5,712	10,988
Poletimber	164,149	--	677	1,186	2,087	8,158	3,784	6,391
Sapling & seedling	48,754	381	1,783	5,077	5,505	13,399	8,549	3,696
All stands	403,435	381	2,460	7,723	11,631	31,811	18,045	21,075
Maple-birch								
Sawtimber	780,096	--	829	--	3,042	15,330	13,709	29,856
Poletimber	1,225,439	--	534	1,850	7,837	23,387	28,644	52,423
Sapling & seedling	123,308	1,766	6,534	5,393	25,199	21,204	22,922	21,989
All stands	2,128,843	1,766	7,897	7,243	36,078	59,921	65,275	104,268
Aspen								
Sawtimber	485,722	--	--	417	5,205	12,962	9,966	28,238
Poletimber	827,613	--	--	1,307	11,208	27,086	32,120	80,057
Sapling & seedling	269,770	2,422	11,916	16,637	34,684	49,829	38,432	51,505
All stands	1,583,105	2,422	11,916	18,361	51,097	89,877	80,518	159,800
Paper birch								
Sawtimber	4,824	--	--	--	--	--	1,236	--
Poletimber	108,114	--	--	--	1,007	1,897	3,859	8,377
Sapling & seedling	6,429	--	108	--	375	876	1,085	2,348
All stands	119,367	--	108	--	1,382	2,773	6,180	10,725
Exotic								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	22,687	--	--	--	--	--	--	--
Sapling & seedling	4,974	--	269	304	323	162	--	--
All stands	27,661	--	269	304	323	162	--	--
Nonstocked	1,635	238	1,085	--	--	--	--	312
All types								
Sawtimber	2,260,000	255	829	5,234	26,695	66,232	53,887	146,888
Poletimber	3,918,799	--	1,481	7,071	28,424	119,571	138,346	253,831
Sapling & seedling	644,232	6,425	31,659	38,623	85,058	116,567	105,457	106,339
Nonstocked	1,635	238	1,085	--	--	--	--	312
All stands	6,824,666	6,918	35,054	50,928	140,177	302,370	297,690	507,370

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine							
Sawtimber	12,075	7,478	8,953	7,727	--	--	--
Poletimber	35,441	22,838	39,630	26,384	17,983	--	--
Sapling & seedling	5,988	2,500	--	--	5,007	--	--
All stands	53,504	32,816	48,583	34,111	22,990	--	--
Red pine							
Sawtimber	8,534	5,495	2,343	19,377	18,586	17,867	13,741
Poletimber	27,784	15,601	14,360	31,050	61,216	78,891	62,019
Sapling & seedling	10,329	4,301	--	1,199	992	--	--
All stands	46,647	25,397	16,703	51,626	80,794	96,758	75,760
White pine							
Sawtimber	6,664	16,068	7,132	20,621	--	12,829	--
Poletimber	2,402	2,428	--	2,132	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	9,066	18,496	7,132	22,753	--	12,829	--
Balsam fir							
Sawtimber	--	--	7,583	2,525	--	7,810	--
Poletimber	2,245	--	--	5,117	7,285	--	--
Sapling & seedling	1,829	2,183	--	--	--	--	--
All stands	4,074	2,183	7,583	7,642	7,285	7,810	--
White spruce							
Sawtimber	--	--	3,766	4,116	--	--	--
Poletimber	--	1,227	--	3,148	--	--	--
Sapling & seedling	2,336	--	--	1,234	--	--	--
All stands	2,336	1,227	3,766	8,498	--	--	--
Black spruce							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	918	1,913	2,485	--	3,584	--
Sapling & seedling	--	--	--	--	293	--	--
All stands	--	918	1,913	2,485	293	3,584	--
Northern white-cedar							
Sawtimber	--	--	10,018	16,791	33,485	34,824	58,927
Poletimber	7,588	5,202	2,841	30,912	81,883	74,108	119,027
Sapling & seedling	2,729	--	2,846	3,861	2,980	569	--
All stands	10,317	5,202	15,705	51,564	118,348	109,501	177,954

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack							
Sawtimber	1,956	--	--	--	--	--	--
Poletimber	--	1,978	--	1,850	--	--	--
Sapling & seedling	1,228	--	--	--	--	--	--
All stands	3,184	1,978	--	1,850	--	--	--
Oak-hickory							
Sawtimber	45,594	52,847	58,012	73,008	44,052	11,245	--
Poletimber	88,348	84,032	103,771	139,150	85,057	26,246	5,875
Sapling & seedling	1,015	744	1,378	--	--	--	--
All stands	134,957	137,623	163,161	212,158	129,109	37,491	5,875
Elm-ash-soft maple							
Sawtimber	15,944	1,928	16,782	40,426	62,650	13,952	6,397
Poletimber	13,743	7,032	28,470	33,400	31,661	24,386	3,174
Sapling & seedling	4,641	--	2,909	2,814	--	--	--
All stands	34,328	8,960	48,161	76,640	94,311	38,338	9,571
Maple-birch							
Sawtimber	65,208	42,724	108,124	195,930	216,873	66,330	22,141
Poletimber	89,959	81,619	142,341	317,375	304,124	155,684	19,662
Sapling & seedling	5,626	2,507	9,253	915	--	--	--
All stands	160,793	126,850	259,718	514,220	520,997	222,014	41,803
Aspen							
Sawtimber	43,746	30,224	53,714	76,785	122,197	57,364	44,904
Poletimber	87,115	82,191	136,218	125,919	174,084	62,622	7,686
Sapling & seedling	22,565	7,524	15,611	7,814	10,831	--	--
All stands	153,426	119,939	205,543	210,518	307,112	119,986	52,590
Paper birch							
Sawtimber	--	--	3,588	--	--	--	--
Poletimber	7,045	4,305	12,374	18,575	39,427	11,248	--
Sapling & seedling	--	--	1,637	--	--	--	--
All stands	7,045	4,305	17,599	18,575	39,427	11,248	--
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	1,327	1,665	5,610	8,112	1,090	4,883	--
Sapling & seedling	2,360	--	1,133	--	423	--	--
All stands	3,687	1,665	6,743	8,112	1,513	4,883	--
Nonstocked	--	--	--	--	--	--	--
All types							
Sawtimber	199,721	156,764	280,015	457,306	497,843	222,221	146,110
Poletimber	362,997	311,036	487,528	745,609	803,810	441,652	217,443
Sapling & seedling	60,646	19,759	34,767	17,837	20,526	569	--
Nonstocked	--	--	--	--	--	--	--
All stands	623,364	487,559	802,310	1,220,752	1,322,179	664,442	363,553

Table 39.--Net volume of sawtimber on commercial forest land by forest type, stand-size class, and basal-area class, Northern Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)						
		0-10	11-20	21-30	31-40	41-50	51-60	61-70
Jack pine								
Sawtimber	257,582	--	--	7,462	15,233	24,128	14,833	65,586
Poletimber	381,274	--	--	2,564	4,192	94,275	17,347	42,686
Sapling & seedling	78,977	623	2,007	1,844	9,016	14,418	16,260	29,289
All stands	717,833	623	2,007	11,870	28,441	132,821	48,440	137,561
Red pine								
Sawtimber	426,672	--	--	--	13,572	23,089	--	39,565
Poletimber	375,900	--	--	--	3,141	2,772	4,802	6,677
Sapling & seedling	50,573	3,604	836	--	--	766	21,892	11,905
All stands	853,145	3,604	836	--	16,713	26,627	26,694	58,147
White pine								
Sawtimber	335,291	--	--	--	7,100	9,508	--	37,198
Poletimber	12,188	--	--	--	--	--	2,789	--
Sapling & seedling	26,550	--	--	4,950	--	2,858	11,851	6,891
All stands	374,029	--	--	4,950	7,100	12,366	14,640	44,089
Balsam fir								
Sawtimber	71,158	--	--	--	--	--	12,550	--
Poletimber	26,113	--	--	--	--	3,582	1,422	1,845
Sapling & seedling	10,816	--	--	--	--	5,942	--	--
All stands	108,087	--	--	--	--	9,524	13,972	1,845
White spruce								
Sawtimber	22,554	--	--	--	--	--	--	--
Poletimber	8,227	--	--	--	--	--	--	--
Sapling & seedling	7,919	--	--	--	--	--	--	--
All stands	38,700	--	--	--	--	--	--	--
Black spruce								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	13,847	--	--	1,378	--	--	--	6,495
Sapling & seedling	5,851	--	2,376	--	2,163	--	--	1,312
All stands	19,698	--	2,376	1,378	2,163	--	--	7,807
Northern white-cedar								
Sawtimber	451,780	--	--	--	--	--	--	5,757
Poletimber	390,327	--	--	--	1,453	--	1,989	2,267
Sapling & seedling	10,050	--	1,175	--	--	--	--	603
All stands	852,157	--	1,175	--	1,453	--	1,989	8,627

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine							
Sawtimber	47,434	25,506	34,988	22,412	--	--	--
Poletimber	60,668	29,030	70,541	37,872	22,099	--	--
Sapling & seedling	3,947	1,573	--	--	--	--	--
All stands	112,049	56,109	105,529	60,284	22,099	--	--
Red pine							
Sawtimber	35,570	27,533	7,280	76,218	76,753	62,712	64,380
Poletimber	43,292	8,837	1,505	40,126	81,050	103,826	79,872
Sapling & seedling	--	11,570	--	--	--	--	--
All stands	78,862	47,940	8,785	116,344	157,803	166,538	144,252
White pine							
Sawtimber	31,644	72,252	29,222	90,604	--	57,763	--
Poletimber	5,383	3,239	--	777	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	37,027	75,491	29,222	91,381	--	57,763	--
Balsam fir							
Sawtimber	--	--	27,850	7,371	--	23,387	--
Poletimber	3,546	--	--	5,105	10,613	--	--
Sapling & seedling	2,556	2,318	--	--	--	--	--
All stands	6,102	2,318	27,850	12,476	10,613	23,387	--
White spruce							
Sawtimber	--	--	11,650	10,904	--	--	--
Poletimber	--	1,838	--	6,389	--	--	--
Sapling & seedling	7,919	--	--	--	--	--	--
All stands	7,919	1,838	11,650	17,293	--	--	--
Black spruce							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	1,138	--	2,372	--	2,464	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	--	1,138	--	2,372	--	2,464	--
Northern white-cedar							
Sawtimber	--	--	38,551	49,495	104,817	86,361	166,799
Poletimber	8,542	6,022	2,265	41,719	95,467	79,323	151,280
Sapling & seedling	3,687	--	2,311	1,934	340	--	--
All stands	12,229	6,022	43,127	93,148	200,624	165,684	318,079

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70
Tamarack								
Sawtimber	11,834	--	--	3,633	2,822	--	--	--
Poletimber	9,625	--	--	--	--	--	--	--
Sapling & seedling	5,110	--	--	--	--	--	--	4,556
All stands	26,569	--	--	3,633	2,822	--	--	4,556
Oak-hickory								
Sawtimber	1,357,343	1,467	--	2,167	20,732	56,029	72,326	155,185
Poletimber	1,087,836	--	481	--	839	32,014	97,033	121,334
Sapling & seedling	157,504	3,086	16,611	9,838	24,853	54,632	15,509	25,789
All stands	2,602,683	4,553	17,092	12,005	46,424	142,675	184,868	302,308
Elm-ash-soft maple								
Sawtimber	704,434	--	--	4,666	12,127	40,314	17,416	41,000
Poletimber	271,507	--	1,343	2,188	810	16,294	5,014	8,329
Sapling & seedling	89,890	394	4,008	10,882	6,613	28,299	8,135	11,527
All stands	1,065,831	394	5,351	17,736	19,550	84,907	30,565	60,856
Maple-birch								
Sawtimber	2,789,848	--	3,543	--	12,802	66,942	46,822	110,435
Poletimber	1,900,924	--	--	2,040	3,243	41,282	46,606	88,035
Sapling & seedling	265,712	5,681	15,722	12,056	49,324	42,649	49,504	45,887
All stands	4,956,484	5,681	19,265	14,096	65,369	150,873	142,932	244,357
Aspen								
Sawtimber	1,594,904	--	--	1,367	19,624	48,706	33,827	111,218
Poletimber	1,254,102	--	--	937	17,955	30,142	43,311	118,092
Sapling & seedling	448,552	8,692	23,113	31,107	64,304	95,497	75,174	64,051
All stands	3,297,558	8,692	23,113	33,411	101,883	174,345	152,312	293,361
Paper birch								
Sawtimber	13,775	--	--	--	--	--	3,865	--
Poletimber	132,225	--	--	--	2,792	3,176	2,031	12,241
Sapling & seedling	4,262	--	--	--	--	--	1,270	2,992
All stands	150,262	--	--	--	2,792	3,176	7,166	15,233
Exotic								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	9,634	--	--	--	--	--	--	--
Sapling & seedling	5,365	--	--	--	--	--	--	--
All stands	14,999	--	--	--	--	--	--	--
Nonstocked	4,147	--	4,147	--	--	--	--	--
All types								
Sawtimber	8,037,175	1,467	3,543	19,295	104,012	268,716	201,639	565,944
Poletimber	5,873,729	--	1,824	9,107	34,425	223,537	222,344	408,001
Sapling & seedling	1,167,131	22,080	65,848	70,677	156,273	245,061	199,595	204,802
Nonstocked	4,147	--	4,147	--	--	--	--	--
All stands	15,082,182	23,547	75,362	99,079	294,710	737,314	623,578	1,178,747

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack							
Sawtimber	5,379	--	--	--	--	--	--
Poletimber	--	6,256	--	3,369	--	--	--
Sapling & seedling	554	--	--	--	--	--	--
All stands	5,933	6,256	--	3,369	--	--	--
Oak-hickory							
Sawtimber	167,359	192,540	195,147	266,493	180,228	47,670	--
Poletimber	151,841	144,919	149,407	229,376	120,242	39,610	740
Sapling & seedling	1,825	1,056	4,305	--	--	--	--
All stands	321,025	338,515	348,859	495,869	300,470	87,280	740
Elm-ash-soft maple							
Sawtimber	58,236	7,415	82,329	142,546	227,816	54,044	16,525
Poletimber	19,254	12,812	41,784	67,530	48,503	44,192	3,454
Sapling & seedling	11,117	--	3,259	5,656	--	--	--
All stands	88,607	20,227	127,372	215,732	276,319	98,236	19,979
Maple-birch							
Sawtimber	255,798	147,740	367,168	695,285	771,134	232,363	79,816
Poletimber	134,519	121,232	226,036	519,265	466,227	233,261	19,178
Sapling & seedling	13,039	7,319	21,623	2,908	--	--	--
All stands	403,356	276,291	614,827	1,217,458	1,237,361	465,624	98,994
Aspen							
Sawtimber	142,512	102,550	171,503	244,384	409,386	180,106	129,721
Poletimber	122,243	165,858	179,600	195,572	268,114	98,804	13,474
Sapling & seedling	34,733	14,869	20,045	9,523	7,444	--	--
All stands	299,488	283,277	371,148	449,479	684,944	278,910	143,195
Paper birch							
Sawtimber	--	--	9,910	--	--	--	--
Poletimber	8,043	3,094	16,304	15,835	46,235	22,474	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	8,043	3,094	26,214	15,835	46,235	22,474	--
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	3,134	--	1,621	4,160	--	719	--
Sapling & seedling	2,527	--	2,838	--	--	--	--
All stands	5,661	--	4,459	4,160	--	719	--
Nonstocked	--	--	--	--	--	--	--
All types							
Sawtimber	743,932	575,536	975,598	1,605,712	1,770,134	744,406	457,241
Poletimber	560,465	504,275	689,063	1,169,467	1,158,550	624,673	267,998
Sapling & seedling	81,904	38,705	54,381	20,021	7,784	--	--
Nonstocked	--	--	--	--	--	--	--
All stands	1,386,301	1,118,516	1,719,042	2,795,200	2,936,468	1,369,079	725,239

1/International 1/4-inch rule.

Table 40.--Net volume of sawtimber on commercial forest land by species group and log-grade class, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All grades	Log grade			
		1	2	3	Tie and timber
SOFTWOODS					
White pine	811,402	30,472	71,512	616,810	92,608
Red pine	1,053,736	28,077	23,335	961,290	41,034
Jack pine	684,828	--	16,273	661,707	6,848
White spruce	121,852	--	13,206	108,646	--
Black spruce	41,690	--	--	41,690	--
Balsam fir	151,930	--	--	147,372	4,558
Hemlock	252,871	9,445	18,538	224,888	--
Tamarack	56,260	4,391	3,787	48,082	--
Northern white-cedar	653,206	1,204	4,270	647,732	--
Other softwoods	11,647	--	--	11,647	--
Total	3,839,422	73,589	150,921	3,469,864	145,048
HARDWOODS					
Select white oaks	572,193	24,437	80,167	353,012	114,577
Select red oaks	2,159,690	124,113	381,102	1,309,095	345,380
Other red oaks	488,102	6,975	39,017	351,509	90,601
Hickory	5,588	17	1,090	4,420	61
Yellow birch	77,578	1,218	14,563	54,816	6,981
Hard maple	1,188,575	47,282	265,929	785,947	89,417
Soft maple	1,450,072	135,559	287,566	937,079	89,868
Beech	389,470	23,238	47,429	267,367	51,436
Ash	487,434	52,303	118,435	303,778	12,918
Balsam poplar	353,766	34,527	59,130	187,934	72,175
Cottonwood	42,830	--	--	39,832	2,998
Bigtooth aspen	1,339,410	24,205	223,111	1,006,141	85,953
Quaking aspen	1,366,066	28,237	140,032	953,136	244,661
Basswood	834,836	138,930	271,408	394,138	30,360
Yellow-poplar	--	--	--	--	--
Black walnut	--	--	--	--	--
Black cherry	172,403	11,731	667	122,475	37,530
Butternut	1,427	--	--	1,427	--
Elm	44,130	--	17,156	23,998	2,976
Paper birch	233,758	2,002	30,007	180,498	21,251
Other hardwoods	35,432	--	5,358	28,531	1,543
Total	11,242,760	654,774	1,982,167	7,305,133	1,300,686
All species	15,082,182	728,363	2,133,088	10,774,997	1,445,734

[1/]International 1/4-inch rule.

Table 41.--Net volume of short-log trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS											
White pine	1,535	517	484	202	257	--	--	75	--	--	--
Red pine	260	77	81	--	--	102	--	--	--	--	--
Jack pine	1,959	1,201	157	483	118	--	--	--	--	--	--
White spruce	67	67	--	--	--	--	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	132	76	56	--	--	--	--	--	--	--	--
Hemlock	835	298	--	291	88	--	--	--	158	--	--
Tamarack	332	272	60	--	--	--	--	--	--	--	--
Northern white-cedar	8,799	4,142	2,219	1,416	391	535	96	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	13,919	6,650	3,057	2,392	854	637	96	75	158	--	--
HARDWOODS											
Select white oaks	5,233	--	1,689	988	655	--	429	290	891	291	--
Select red oaks	10,814	--	3,970	2,271	922	1,879	465	271	303	733	--
Other red oaks	1,930	--	538	565	442	144	--	--	241	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	1,325	--	698	207	420	--	--	--	--	--	--
Hard maple	9,175	--	2,530	1,063	843	800	870	332	2,216	521	--
Soft maple	10,020	--	3,370	1,853	2,091	881	624	851	350	--	--
Beech	6,312	--	437	1,056	502	977	482	974	1,474	410	--
Ash	1,848	--	921	138	331	166	--	--	--	--	292
Balsam poplar	466	--	236	--	141	89	--	--	--	--	--
Cottonwood	92	--	--	--	--	--	--	92	--	--	--
Bigtooth aspen	5,007	--	2,002	1,118	886	405	205	143	248	--	--
Quaking aspen	5,383	--	2,106	894	1,039	624	256	369	95	--	--
Basswood	2,123	--	728	453	199	313	277	153	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	1,397	--	427	290	406	--	274	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	697	--	108	431	--	--	158	--	--	--	--
Paper birch	2,117	--	1,453	284	118	120	142	--	--	--	--
Other hardwoods	142	--	--	--	--	142	--	--	--	--	--
Total	64,081	--	21,213	11,611	8,995	6,540	4,182	3,475	5,818	1,955	292
All species	78,000	6,650	24,270	14,003	9,849	7,177	4,278	3,550	5,976	1,955	292

Table 42.--Net volume of short-log trees on commercial forest land by species group and diameter class, Northern Lower Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 28.9	29.0- 38.9	39.0+
SOFTWOODS											
White pine	6,685	2,903	1,970	742	890	--	--	180	--	--	--
Red pine	1,122	421	399	--	--	302	--	--	--	--	--
Jack pine	9,878	6,791	698	1,889	500	--	--	--	--	--	--
White spruce	430	430	--	--	--	--	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	698	452	246	--	--	--	--	--	--	--	--
Hemlock	3,532	1,730	--	1,175	307	--	--	--	320	--	--
Tamarack	1,718	1,416	302	--	--	--	--	--	--	--	--
Northern white-cedar	27,288	15,058	6,882	3,511	790	896	151	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	51,351	29,201	10,497	7,317	2,487	1,198	151	180	320	--	--
HARDWOODS											
Select white oaks	14,056	--	4,548	2,489	1,798	--	1,227	910	2,308	776	--
Select red oaks	31,690	--	12,346	6,594	3,081	5,001	1,246	802	913	1,707	--
Other red oaks	5,669	--	1,579	1,645	1,247	435	--	--	763	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	6,549	--	3,286	1,250	2,013	--	--	--	--	--	--
Hard maple	20,675	--	6,993	3,150	2,430	1,831	1,928	662	3,130	551	--
Soft maple	29,606	--	10,019	5,652	6,015	2,288	1,802	2,910	920	--	--
Beech	16,487	--	1,190	2,964	1,303	2,520	1,245	2,561	4,019	685	--
Ash	4,933	--	2,758	369	847	430	--	--	--	--	529
Balsam poplar	1,177	--	621	--	388	168	--	--	--	--	--
Cottonwood	337	--	--	--	--	--	--	337	--	--	--
Bigtooth aspen	12,677	--	5,899	2,582	2,063	966	410	314	443	--	--
Quaking aspen	13,782	--	5,739	2,559	2,547	1,516	553	715	153	--	--
Basswood	5,125	--	2,173	1,201	447	803	122	379	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	3,608	--	1,263	618	915	--	812	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	1,878	--	334	1,111	--	--	433	--	--	--	--
Paper birch	6,693	--	4,613	867	370	384	459	--	--	--	--
Other hardwoods	379	--	--	--	--	379	--	--	--	--	--
Total	175,321	--	63,361	33,051	25,464	16,721	10,237	9,590	12,649	3,719	529
All species	226,672	29,201	73,858	40,368	27,951	17,919	10,388	9,770	12,969	3,719	529

[1/] International 1/4-inch rule.

Table 43.--Net annual growth of growing stock on commercial forest land by softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1965[1/] and 1979

(In million cubic feet)

Species	1965[1/]	1979
Softwoods	54.7	76.4
Hardwoods	141.0	186.6
All species	195.7	263.0

1/Figures have been adjusted from those published after the 1965 survey to conform to 1979 volumes because of changes in survey definitions and procedures.

Table 44.--Net annual growth of growing stock on commercial forest land by species group and county, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	7,359	308	262	35	60	--	16	203	409	177	200	35
Red pine	32,209	955	113	30	11	--	956	354	1,045	988	1,013	235
Jack pine	14,588	328	94	--	99	--	--	-6	514	774	2,040	--
White spruce	2,483	166	664	1	--	--	--	138	247	--	--	63
Black spruce	1,081	2	7	-75	--	--	6	28	61	--	5	35
Balsam fir	1,591	221	76	-115	135	--	18	161	-93	63	47	93
Hemlock	1,360	11	7	53	--	--	131	33	38	4	12	41
Tamarack	-1,568	1	-24	-99	-2	--	-12	33	-103	-6	-12	-343
Northern white-cedar	14,711	394	1,016	340	157	--	146	1,008	1,542	597	127	740
Other softwoods	2,584	1	7	111	160	--	146	--	78	--	1	--
Total	76,398	2,387	2,222	281	620	--	1,407	1,952	3,738	2,597	3,433	899
HARDWOODS												
Select white oaks	5,645	171	27	--	11	6	6	--	19	252	302	--
Select red oaks	21,281	1,968	758	--	347	4	14	62	309	811	1,796	131
Other red oaks	4,565	399	--	--	54	--	--	--	139	285	270	--
Hickory	50	--	--	--	--	--	--	--	--	2	--	--
Yellow birch	799	16	--	44	10	--	-40	187	23	--	--	46
Hard maple	23,690	191	50	2,237	27	--	1,459	1,133	2,047	26	568	2,692
Soft maple	42,752	1,633	1,512	996	961	144	1,221	423	1,852	2,092	1,140	1,464
Beech	1,378	74	--	193	-6	--	-22	31	43	37	40	146
Ash	13,059	993	421	303	738	289	205	784	578	263	16	766
Balsam poplar	1,226	170	299	31	24	--	--	19	107	6	18	204
Cottonwood	322	--	--	--	18	25	--	--	--	10	--	--
Bigtooth aspen	28,441	946	1,625	994	563	80	143	435	1,797	1,380	517	476
Quaking aspen	20,759	769	734	462	464	65	383	54	1,032	907	765	635
Basswood	9,876	410	50	841	30	39	285	1,094	1,648	17	112	488
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	3	--	--	--	--	--	--	--	--	--	--	--
Black cherry	5,876	152	7	145	32	--	539	34	14	257	206	360
Butternut	7	--	--	--	--	--	--	--	--	--	--	--
Elm	-2,502	-39	-24	-414	74	76	-30	-455	-213	-3	-7	-69
Paper birch	9,155	710	811	29	269	189	51	200	620	391	83	195
Other hardwoods	267	11	--	--	27	--	--	--	-5	4	7	--
Total	186,649	8,574	6,270	5,861	3,643	917	4,214	4,001	10,010	6,737	5,833	7,534
All species	263,047	10,961	8,492	6,142	4,263	917	5,621	5,953	13,748	9,334	9,266	8,433

(Table 44 continued on next page)

(Table 44 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	231	310	261	21	176	423	77	218	116	216	221	416
Red pine	95	1,305	2,185	26	2,388	2,866	260	1,819	719	162	153	419
Jack pine	74	339	927	--	509	991	--	262	250	9	6	82
White spruce	--	--	58	4	10	--	--	--	--	353	--	25
Black spruce	--	-4	-4	--	24	2	52	1	2	--	--	5
Balsam fir	32	--	137	--	106	5	3	10	5	--	--	6
Hemlock	3	49	30	39	28	240	21	38	19	52	18	103
Tamarack	--	-111	10	-5	-1	-9	-30	-538	-9	--	--	101
Northern white-cedar	33	367	337	96	530	371	117	293	49	308	--	306
Other softwoods	--	13	--	288	201	359	--	119	102	29	--	11
Total	468	2,268	3,941	469	3,971	5,248	500	2,222	1,253	1,129	398	1,474
HARDWOODS												
Select white oaks	71	157	75	98	32	1,047	--	340	656	97	198	88
Select red oaks	381	269	399	185	521	1,883	79	706	563	148	318	541
Other red oaks	83	1	393	14	--	526	--	276	271	28	4	10
Hickory	4	4	--	--	--	--	--	--	--	6	11	--
Yellow birch	3	21	5	--	57	4	9	11	17	19	8	3
Hard maple	--	651	25	7	1,488	76	1,329	966	175	116	4	548
Soft maple	2,087	1,029	1,547	827	1,507	1,502	139	1,902	775	785	1,725	1,773
Beech	--	-15	2	1	2	27	-7	12	20	5	210	181
Ash	601	21	499	441	199	149	972	214	91	290	496	342
Balsam poplar	105	-3	48	-30	--	5	2	2	1	-1	-4	10
Cottonwood	24	--	8	18	--	--	--	--	--	--	29	7
Bigtooth aspen	1,376	562	538	1,135	606	1,287	53	361	974	1,055	1,652	1,438
Quaking aspen	1,827	352	448	568	592	422	11	510	776	386	702	727
Basswood	32	96	47	17	973	116	291	119	33	104	74	105
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	37	76	206	21	207	198	15	440	204	491	25	145
Butternut	--	--	--	3	--	--	--	--	--	--	--	--
Elm	-153	-50	-40	-8	-156	-94	-103	-57	-58	-119	62	-59
Paper birch	683	132	176	395	60	31	21	96	46	126	505	470
Other hardwoods	13	--	62	6	--	12	--	22	15	--	17	4
Total	7,174	3,303	4,438	3,698	6,088	7,191	2,811	5,920	4,559	3,536	6,036	6,333
All species	7,642	5,571	8,379	4,167	10,059	12,439	3,311	8,142	5,812	4,665	6,434	7,807

(Table 44 continued on next page)

(Table 44 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	158	600	189	65	269	307	682	95	362	241
Red pine	1,193	2,671	544	192	--	1,948	1,665	721	587	4,591
Jack pine	825	521	87	1,075	20	1,815	455	1,037	1,030	431
White spruce	213	--	131	33	23	73	70	173	38	--
Black spruce	-10	2	2	-3	-13	-4	359	223	259	119
Balsam fir	240	7	5	31	-68	280	-6	234	-26	-16
Hemlock	16	63	81	8	113	--	21	31	4	53
Tamarack	-150	-21	-12	--	-122	1	2	-62	-11	-34
Northern white-cedar	514	227	77	345	494	132	304	1,682	1,407	655
Other softwoods	122	332	43	--	13	1	--	6	--	441
Total	3,121	4,402	1,147	1,746	729	4,553	3,552	4,140	3,650	6,481
HARDWOODS										
Select white oaks	63	889	262	43	23	139	14	15	433	111
Select red oaks	1,302	1,322	417	1,130	423	1,030	288	608	2,220	348
Other red oaks	14	940	218	35	--	433	47	--	18	107
Hickory	--	21	--	--	2	--	--	--	--	--
Yellow birch	--	174	30	10	37	4	38	23	9	31
Hard maple	1,108	265	368	125	600	543	3,003	450	39	1,374
Soft maple	1,738	2,126	1,198	1,290	1,256	938	1,223	736	1,690	1,521
Beech	183	9	21	4	9	28	45	19	-1	87
Ash	269	247	341	436	635	211	351	504	274	120
Balsam poplar	-24	--	28	-85	13	32	63	167	11	8
Cottonwood	--	5	167	--	11	--	--	--	--	--
Bigtooth aspen	573	1,029	587	1,391	697	760	511	759	956	1,185
Quaking aspen	691	598	206	1,008	437	691	777	1,433	619	708
Basswood	593	158	69	77	127	132	1,286	187	39	187
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	3
Black cherry	48	396	338	87	333	70	295	--	99	399
Butternut	--	4	--	--	--	--	--	--	--	--
Elm	-46	-32	-33	-32	67	--	-365	-82	--	-40
Paper birch	724	47	70	463	309	307	177	434	169	166
Other hardwoods	--	29	39	6	-2	--	--	--	--	--
Total	7,236	8,227	4,326	5,988	4,977	5,318	7,753	5,253	6,575	6,315
All species	10,357	12,629	5,473	7,734	5,706	9,871	11,305	9,393	10,225	12,796

(Table 45 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	1,944	849	1,101	81	810	2,690	385	1,079	1,219	829	1,771	1,610
Red pine	376	1,722	5,451	51	3,353	7,042	--	3,324	1,811	339	423	270
Jack pine	248	1,945	3,802	--	2,679	2,079	--	253	425	28	--	224
White spruce	--	--	130	--	--	--	--	--	--	--	--	--
Black spruce	--	--	--	--	-11	--	--	--	--	--	--	-20
Balsam fir	751	--	748	--	199	--	--	--	--	--	--	-48
Hemlock	20	155	191	174	113	76	106	73	81	266	94	10
Tamarack	--	476	98	-20	--	1	-35	-2,616	--	--	--	-4
Northern white-cedar	50	1,515	1,081	561	1,468	200	667	98	72	934	--	1,938
Other softwoods	--	--	2	628	--	777	--	--	785	--	--	719
Total	3,389	6,662	12,604	1,475	8,611	12,865	1,123	2,211	4,393	2,396	2,288	4,699
HARDWOODS												
Select white oaks	173	409	975	377	67	6,834	--	2,130	1,141	411	2,296	266
Select red oaks	740	2,437	874	778	932	8,644	1,159	1,573	2,752	3,031	1,780	3,809
Other red oaks	892	5	677	91	--	2,499	--	1,247	1,066	121	23	62
Hickory	31	--	--	--	--	--	--	--	--	--	34	--
Yellow birch	16	46	24	--	1,578	1	27	--	13	--	21	19
Hard maple	--	749	59	21	4,111	202	4,408	6,237	406	408	--	2,644
Soft maple	1,875	2,343	4,273	2,253	645	2,084	206	11,374	2,939	1,668	7,255	8,445
Beech	--	-86	--	1	-52	841	-129	-38	10	--	-17	107
Ash	1,147	-127	411	820	850	1,236	4,699	1,348	114	435	2,173	2,474
Balsam poplar	24	-76	1,243	-168	--	14	--	7	-1	-10	-31	-12
Cottonwood	61	--	43	93	--	--	--	--	--	--	127	36
Bigtooth aspen	6,768	2,680	645	3,247	1,039	3,555	63	356	421	3,247	8,426	2,548
Quaking aspen	9,290	3,775	5,380	1,281	2,796	622	46	1,431	1,581	256	3,469	1,511
Basswood	79	1,368	194	39	1,876	1,516	1,968	299	119	1,057	272	312
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	--	103	--	52	318	531	--	1,607	173	5	--	85
Butternut	--	--	--	17	--	--	--	--	--	--	--	--
Elm	-100	-183	-82	--	-193	-183	-144	-97	918	-250	--	-148
Paper birch	38	56	-32	--	34	87	55	980	21	1,091	993	3,091
Other hardwoods	837	--	295	31	--	--	--	--	--	--	883	23
Total	21,871	13,499	14,979	8,933	14,001	28,483	12,358	28,454	11,673	11,470	27,704	25,272
All species	25,260	20,161	27,583	10,408	22,612	41,348	13,481	30,665	16,066	13,866	29,992	29,971

(Table 45 continued on next page)

Table 45.--Net annual growth of sawtimber on commercial forest land by species group and county, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	39,030	1,753	2,442	203	232	--	46	1,026	1,763	925	819	160
Red pine	73,439	1,929	338	9	55	--	--	1,248	4,578	423	4,660	776
Jack pine	56,093	3,221	116	--	937	--	--	23	2,944	3,022	8,496	--
White spruce	7,748	360	1,730	5	--	--	--	541	778	--	--	108
Black spruce	-55	24	--	-266	--	--	--	9	35	--	408	-139
Balsam fir	7,348	1,318	661	41	--	--	--	144	626	77	19	2,112
Hemlock	5,597	75	39	288	--	--	174	141	195	22	77	213
Tamarack	-1,882	--	-23	-3	-5	--	23	-4	-82	-26	-38	--
Northern white-cedar	32,964	667	2,043	1,700	12	--	112	1,150	2,225	822	72	218
Other softwoods	4,288	7	--	644	6	--	660	--	--	--	2	--
Total	224,570	9,354	7,346	2,621	1,237	--	1,015	4,278	13,062	5,265	14,515	3,448
HARDWOODS												
Select white oaks	25,985	1,520	66	--	14	38	--	--	36	2,910	290	--
Select red oaks	113,864	10,482	4,595	--	653	--	66	950	2,279	6,156	11,263	443
Other red oaks	17,573	953	--	--	175	--	--	--	49	1,467	412	--
Hickory	128	--	--	--	--	--	--	--	--	11	--	--
Yellow birch	3,846	--	--	31	--	--	-126	22	44	--	--	45
Hard maple	69,970	1,177	102	4,312	--	--	9,560	4,408	4,786	110	1,165	11,183
Soft maple	109,124	7,817	3,286	4,080	2,885	270	3,473	492	1,284	3,622	169	448
Beech	2,969	63	--	149	-27	--	-132	11	958	89	4	891
Ash	38,964	3,158	1,067	1,501	3,736	577	457	2,557	417	210	43	722
Balsam poplar	10,606	3,382	1,256	-2	1,203	--	--	1,167	-78	-17	16	80
Cottonwood	1,025	--	--	--	95	108	--	--	--	37	--	--
Bigtooth aspen	111,076	2,722	7,903	4,877	3,592	223	1,374	1,938	10,035	5,006	549	4,754
Quaking aspen	90,673	6,257	1,130	1,816	5,745	41	1,103	-6	5,963	4,853	273	6,645
Basswood	50,875	3,682	109	3,113	63	--	5,073	6,450	3,646	37	1,311	3,228
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	12,076	214	--	147	--	--	795	--	--	1,178	--	670
Butternut	43	--	--	--	--	--	--	--	--	--	--	--
Elm	-1,315	--	--	-479	--	--	-80	-1,059	-154	--	--	--
Paper birch	19,022	1,840	2,918	-3	953	--	847	1,089	1,044	94	970	124
Other hardwoods	2,273	59	--	--	92	--	--	--	-28	12	--	--
Total	678,777	43,326	22,432	19,542	19,179	1,257	22,410	18,019	30,281	25,775	16,465	29,233
All species	903,347	52,680	29,778	22,163	20,416	1,257	23,425	22,297	43,343	31,040	30,980	32,681

(Table 45 continued on next page)

[1/] International 1/4-inch rule.

(Table 45 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	1,329	2,982	1,736	131	622	1,555	3,141	484	2,440	873
Red pine	3,161	5,904	1,697	397	--	7,517	1,186	2,368	3,519	9,512
Jack pine	4,796	666	170	3,265	52	8,234	1,233	1,201	4,133	1,901
White spruce	2,071	--	--	718	--	102	148	1,057	--	--
Black spruce	-15	--	--	--	-55	-16	52	-60	-1	--
Balsam fir	883	--	--	-120	-248	282	-316	1,137	-902	-16
Hemlock	76	218	723	523	585	1	135	125	8	620
Tamarack	--	-28	1	--	-270	--	25	-37	684	1
Northern white-cedar	2,195	253	86	1,459	1,460	1,596	219	5,748	1,389	954
Other softwoods	30	21	--	--	--	7	--	--	--	--
Total	14,526	10,016	4,413	6,373	2,146	19,278	5,823	12,023	11,270	13,845
HARDWOODS										
Select white oaks	101	2,255	2,043	44	61	329	--	39	707	453
Select red oaks	9,738	4,790	2,492	5,638	1,572	7,618	1,694	2,436	10,898	1,592
Other red oaks	--	3,689	981	165	--	830	101	--	18	2,050
Hickory	--	36	--	--	16	--	--	--	--	--
Yellow birch	--	867	46	--	45	--	38	89	-3	1,003
Hard maple	1,142	346	285	57	3,257	1,135	4,291	274	--	3,135
Soft maple	682	12,039	5,220	3,436	5,962	472	1,800	1,916	2,197	2,214
Beech	-1	-48	69	3	46	--	102	28	--	127
Ash	324	514	1,014	290	543	974	406	7	3,646	1,221
Balsam poplar	-185	-44	8	786	-10	197	893	947	-13	30
Cottonwood	--	23	341	--	61	--	--	--	--	--
Bigtooth aspen	487	1,690	1,411	10,050	5,574	3,342	3,269	528	5,114	3,643
Quaking aspen	1,091	2,436	376	3,121	4,824	1,242	2,278	5,989	3,356	702
Basswood	1,934	1,340	174	357	557	1,029	6,626	353	178	2,516
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Black cherry	143	2,512	791	--	1,757	125	96	--	--	774
Butternut	--	26	--	--	--	--	--	--	--	--
Elm	1,729	-80	16	-53	--	--	-862	--	--	169
Paper birch	108	65	40	117	935	1,275	48	29	84	31
Other hardwoods	--	60	-21	30	--	--	--	--	--	--
Total	17,293	32,516	15,286	24,041	25,200	18,568	20,780	12,635	26,182	19,660
All species	31,819	42,532	19,699	30,414	27,346	37,846	26,603	24,658	37,452	33,505

Table 46.--Net annual growth of growing stock on commercial forest land by species group and ownership class, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	7,359	390	--	--	--	2,292	51	64	1,031	1,073	2,458
Red pine	32,209	13,116	--	7	--	7,998	144	291	4,357	1,861	4,435
Jack pine	14,588	3,374	--	35	--	6,294	40	38	676	345	3,786
White spruce	2,483	--	--	--	--	430	66	13	621	396	957
Black spruce	1,081	16	--	--	--	683	--	-8	223	-8	175
Balsam fir	1,591	341	--	--	--	-1	43	-43	657	179	415
Hemlock	1,360	24	--	--	--	241	4	4	522	50	515
Tamarack	-1,568	-76	--	--	--	-267	--	-75	-313	-530	-307
Northern white-cedar	14,711	471	--	--	--	4,820	28	223	3,949	594	4,626
Other softwoods	2,584	4	--	--	--	107	--	--	939	194	1,340
Total	76,398	17,660	--	42	--	22,597	376	507	12,662	4,154	18,400
HARDWOODS											
Select white oak	5,645	1,230	--	13	--	993	23	29	341	482	2,534
Select red oaks	21,281	723	--	7	--	6,610	110	302	2,779	2,129	8,621
Other red oaks	4,565	2,936	--	22	--	431	60	33	193	113	777
Hickory	50	--	--	--	--	--	--	--	36	--	14
Yellow birch	799	4	--	--	--	239	--	14	195	22	325
Hard maple	23,690	981	--	--	--	5,562	41	56	8,057	816	8,177
Soft maple	42,752	2,199	--	--	--	11,757	627	883	7,951	3,333	16,002
Beech	1,378	123	--	--	--	179	12	1	385	59	619
Ash	13,059	162	--	--	--	2,595	40	315	3,455	988	5,504
Balsam poplar	1,226	50	--	--	--	364	3	24	314	26	445
Cottonwood	322	--	--	--	--	12	--	4	44	20	242
Bigtooth aspen	28,441	2,336	--	--	--	7,459	297	210	4,660	2,296	11,183
Quaking aspen	20,759	1,171	--	108	--	5,075	227	135	4,138	1,880	8,025
Basswood	9,876	251	--	--	--	2,937	--	50	3,459	437	2,742
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	3	--	--	--	--	--	--	--	--	--	3
Black cherry	5,876	617	--	--	--	1,130	21	13	1,662	634	1,799
Butternut	7	--	--	--	--	--	--	--	7	--	--
Elm	-2,502	95	--	--	--	-799	--	-34	-705	-35	-1,024
Paper birch	9,155	186	--	--	--	2,232	17	294	2,076	950	3,400
Other hardwoods	267	--	--	--	--	-1	--	4	90	7	167
Total	186,649	13,064	--	150	--	46,775	1,478	2,333	39,137	14,157	69,555
All species	263,047	30,724	--	192	--	69,372	1,854	2,840	51,799	18,311	87,955

Table 47.--Net annual growth of sawtimber on commercial forest land by species group and ownership class, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	39,030	2,056	--	--	--	11,516	854	218	5,631	5,027	13,728
Red pine	73,439	29,698	--	--	--	22,836	297	230	6,174	4,531	9,673
Jack pine	56,093	15,477	--	23	--	27,126	--	139	3,025	843	9,460
White spruce	7,748	--	--	--	--	1,878	142	13	2,614	774	2,327
Black spruce	-55	--	--	--	--	317	--	-32	-186	-30	-124
Balsam fir	7,348	212	--	--	--	-1,013	752	-239	5,208	638	1,790
Hemlock	5,597	78	--	--	--	481	--	25	2,324	205	2,484
Tamarack	-1,882	5	--	--	--	621	--	-86	-342	-2,606	526
Northern white-cedar	32,964	880	--	--	--	7,403	42	622	7,220	1,274	15,523
Other softwoods	4,288	19	--	--	--	--	--	--	2,187	661	1,421
Total	224,570	48,425	--	23	--	71,165	2,087	890	33,855	11,317	56,808
HARDWOODS											
Select white oaks	25,985	5,299	--	--	--	4,616	44	79	3,772	4,476	7,699
Select red oaks	113,864	3,065	--	--	--	34,268	498	2,133	18,956	11,142	43,802
Other red oaks	17,573	10,514	--	--	--	1,403	23	133	1,129	1,217	3,154
Hickory	128	--	--	--	--	--	--	--	63	--	65
Yellow birch	3,846	5	--	--	--	68	--	36	2,701	59	977
Hard maple	69,970	801	--	--	--	12,061	62	13	27,254	2,771	27,008
Soft maple	109,124	5,158	--	--	--	24,900	217	2,376	20,534	8,352	47,587
Beech	2,969	120	--	--	--	173	39	7	1,211	1,634	-215
Ash	38,964	543	--	--	--	5,857	753	389	5,929	2,372	23,121
Balsam poplar	10,606	624	--	--	--	3,255	--	11	-620	1,810	5,526
Cottonwood	1,025	--	--	--	--	67	--	21	169	106	662
Bigtooth aspen	111,076	4,121	--	--	--	30,776	3,823	1,125	15,762	8,628	46,841
Quaking aspen	90,673	4,243	--	--	--	20,343	1,076	1,185	22,661	3,245	37,920
Basswood	50,875	439	--	--	--	14,384	--	1,244	11,123	5,360	18,325
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	12,076	1,174	--	--	--	2,191	17	32	4,430	371	3,861
Butternut	43	--	--	--	--	--	--	--	43	--	--
Elm	-1,315	234	--	--	--	-747	--	-112	452	-152	-990
Paper birch	19,022	272	--	--	--	6,134	--	52	4,122	203	8,239
Other hardwoods	2,273	--	--	--	--	856	--	23	183	25	1,186
Total	678,777	36,612	--	--	--	160,605	6,552	8,747	139,874	51,619	274,768
All species	903,347	85,037	--	23	--	231,770	8,639	9,637	173,729	62,936	331,576

[1/]International 1/4-inch rule.

Table 48.--Net annual growth of growing stock on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	7,359	237	664	1,846	103	10	50	324
Red pine	32,209	1,738	25,256	375	20	--	--	23
Jack pine	14,588	10,518	1,223	63	--	--	--	--
White spruce	2,483	--	193	241	282	652	43	342
Black spruce	1,081	8	12	15	212	5	344	283
Balsam fir	1,591	6	30	71	470	121	39	-1,459
Hemlock	1,360	--	134	--	--	--	--	146
Tamarack	-1,568	-1	--	--	-5	--	1	-1,717
Northern white-cedar	14,711	--	18	29	205	70	215	8,741
Other softwoods	2,584	--	101	436	--	--	--	179
Total	76,398	12,506	27,631	3,076	1,287	858	692	6,862
HARDWOODS								
Select white oaks	5,645	53	192	57	--	--	--	--
Select red oaks	21,281	919	238	140	--	--	--	--
Other red oaks	4,565	420	199	--	--	--	--	--
Hickory	50	--	--	--	--	--	--	--
Yellow birch	799	--	--	8	--	--	--	7
Hard maple	23,690	4	37	--	5	--	--	9
Soft maple	42,752	135	245	351	188	10	90	583
Beech	1,378	--	3	--	--	--	--	--
Ash	13,059	--	-20	--	9	--	--	201
Balsam poplar	1,226	--	--	--	10	-1	26	-140
Cottonwood	322	--	--	--	--	--	--	--
Bigtooth aspen	28,441	66	436	186	2	2	--	-60
Quaking aspen	20,759	227	284	99	152	147	21	122
Basswood	9,876	11	20	--	--	--	--	15
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	3	--	3	--	--	--	--	--
Black cherry	5,876	16	98	14	27	--	6	14
Butternut	7	--	--	--	--	--	--	--
Elm	-2,502	-18	--	-7	--	--	--	-381
Paper birch	9,155	124	18	42	146	4	14	397
Other hardwoods	267	--	--	--	--	--	--	-7
Total	186,649	1,957	1,753	890	539	162	157	760
All species	263,047	14,463	29,384	3,966	1,826	1,020	849	7,622

(Table 48 continued on next page)

(Table 48 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	24	680	312	1,586	1,453	62	8	--
Red pine	--	1,710	34	1,089	1,593	57	302	12
Jack pine	110	1,862	--	277	451	--	14	70
White spruce	--	--	56	40	584	50	--	--
Black spruce	25	1	26	4	5	141	--	--
Balsam fir	20	82	107	262	1,603	229	--	10
Hemlock	--	11	64	904	73	28	--	--
Tamarack	178	--	-2	-17	-1	-4	--	--
Northern white-cedar	40	8	1,411	968	2,663	339	4	--
Other softwoods	--	4	--	1	9	--	1,854	--
Total	397	4,358	2,008	5,114	8,433	902	2,182	92
HARDWOODS								
Select white oaks	--	4,590	88	307	347	11	--	--
Select red oaks	--	14,087	108	2,352	3,342	72	20	3
Other red oaks	--	3,693	14	94	145	--	--	--
Hickory	--	--	--	46	--	4	--	--
Yellow birch	--	15	225	338	29	176	1	--
Hard maple	--	91	109	22,231	1,133	60	11	--
Soft maple	3	4,918	6,402	17,130	11,885	787	14	11
Beech	--	173	6	1,087	100	9	--	--
Ash	11	482	3,347	6,136	2,531	329	3	30
Balsam poplar	3	10	31	62	1,193	23	9	--
Cottonwood	--	--	184	60	78	--	--	--
Bigtooth aspen	--	4,015	155	3,061	20,488	90	--	--
Quaking aspen	4	634	519	2,559	15,615	361	15	--
Basswood	--	219	293	8,831	398	75	14	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	306	311	3,809	1,222	11	18	24
Butternut	--	3	--	4	--	--	--	--
Elm	--	-15	-267	-1,662	-199	59	-12	--
Paper birch	11	268	567	2,021	3,794	1,749	--	--
Other hardwoods	--	20	85	78	87	4	--	--
Total	32	33,509	12,177	68,544	62,188	3,820	93	68
All species	429	37,867	14,185	73,658	70,621	4,722	2,275	160

Table 49.--Net annual growth of sawtimber on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	39,030	923	1,910	10,253	1,847	58	249	2,142
Red pine	73,439	7,356	45,115	1,609	226	--	--	99
Jack pine	56,093	41,938	4,571	799	--	--	--	--
White spruce	7,748	--	143	1,014	488	949	58	931
Black spruce	-55	-11	--	21	45	--	524	-759
Balsam fir	7,348	--	--	201	1,585	643	11	-3,899
Hemlock	5,597	--	49	--	--	--	--	321
Tamarack	-1,882	--	--	--	--	--	11	-1,989
Northern white-cedar	32,964	--	10	28	236	93	86	20,717
Other softwoods	4,288	--	628	777	--	--	--	--
Total	224,570	50,206	52,426	14,702	4,427	1,743	939	17,563
HARDWOODS								
Select white oaks	25,985	153	147	303	--	--	--	--
Select red oaks	113,864	4,341	731	1,860	--	--	--	--
Other red oaks	17,573	616	539	--	--	--	--	--
Hickory	128	--	--	--	--	--	--	--
Yellow birch	3,846	--	--	23	--	--	--	831
Hard maple	69,970	--	267	--	--	--	--	12
Soft maple	109,124	80	518	61	163	--	--	1,685
Beech	2,969	--	24	--	--	--	--	--
Ash	38,964	--	-127	--	--	--	--	20
Balsam poplar	10,606	--	--	--	-9	-42	--	-915
Cottonwood	1,025	--	--	--	--	--	--	--
Bigtooth aspen	111,076	946	932	124	15	13	--	-86
Quaking aspen	90,673	1,052	2	83	1,053	--	635	-111
Basswood	50,875	21	60	--	--	--	--	44
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	12,076	--	179	--	--	--	--	--
Butternut	43	--	--	--	--	--	--	--
Elm	-1,315	--	--	--	--	--	--	-795
Paper birch	19,022	--	31	32	1,016	--	957	1,872
Other hardwoods	2,273	--	--	--	--	--	--	-28
Total	678,777	7,209	3,303	2,486	2,238	-29	1,592	2,529
All species	903,347	57,415	55,729	17,188	6,665	1,714	2,531	20,092

[1/]International 1/4-inch rule.

(Table 49 continued on next page)

(Table 49 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	92	4,021	2,125	7,374	7,768	225	43	--
Red pine	--	6,369	121	2,272	10,067	130	--	75
Jack pine	82	5,386	0	654	2,590	--	49	24
White spruce	--	--	228	131	3,747	59	--	--
Black spruce	102	--	2	--	21	--	--	--
Balsam fir	--	42	107	204	7,773	681	--	--
Hemlock	--	44	154	4,206	758	65	--	--
Tamarack	68	--	7	2	24	-5	--	--
Northern white-cedar	61	28	2,863	1,010	5,903	1,929	--	--
Other softwoods	--	19	--	664	6	--	2,194	--
Total	405	15,909	5,607	16,517	38,657	3,084	2,286	99
HARDWOODS								
Select white oaks	--	17,946	274	2,220	4,884	58	--	--
Select red oaks	--	70,377	269	17,970	17,247	1,010	37	22
Other red oaks	--	13,467	18	401	2,532	--	--	--
Hickory	--	--	0	97	--	31	--	--
Yellow birch	--	16	993	1,964	7	4	8	--
Hard maple	--	48	157	66,889	1,553	1,011	33	--
Soft maple	--	8,511	33,119	49,671	13,973	1,245	42	56
Beech	--	840	27	2,037	40	1	--	--
Ash	--	3,573	8,288	24,788	2,348	54	20	--
Balsam poplar	1	18	-214	55	10,500	1,212	--	--
Cottonwood	--	--	499	228	298	--	--	--
Bigtooth aspen	--	11,481	2,003	15,107	80,436	105	--	--
Quaking aspen	--	1,151	5,428	22,802	58,229	349	--	--
Basswood	--	37	2,493	44,214	2,687	1,319	--	--
Yellow-poplar	--	--	0	--	--	--	--	--
Black walnut	--	--	0	--	--	--	--	--
Black cherry	--	870	1,213	7,752	2,020	--	42	--
Butternut	--	17	0	26	--	--	--	--
Elm	--	--	493	-781	-232	--	--	--
Paper birch	6	1,281	2,919	869	7,922	2,117	--	--
Other hardwoods	--	32	268	264	854	883	--	--
Total	7	129,665	58,247	256,573	205,298	9,399	182	78
All species	412	145,574	63,854	273,090	243,955	12,483	2,468	177

Table 50.--Net annual growth of growing stock on commercial forest land by forest type and stand-age class, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	14,463	645	2,033	1,309	2,048	3,765	2,157	847	1,283	223	73	53	27	--
Red pine	29,384	563	3,374	14,109	6,027	2,997	323	613	313	515	261	289	--	--
White pine	3,966	36	250	436	--	496	572	141	413	526	781	76	239	--
Balsam fir	1,826	--	330	132	--	321	420	304	55	247	--	52	-35	--
White spruce	1,020	159	621	--	--	--	140	--	--	157	--	--	--	-57
Black spruce	849	130	38	--	--	296	170	5	210	--	--	--	--	--
Northern white-cedar	7,622	259	279	134	594	594	1,768	1,126	1,508	510	128	537	151	34
Tamarack	429	109	35	38	9	--	105	125	5	--	--	3	--	--
Oak-hickory	37,867	2,090	1,091	516	2,313	5,356	9,977	5,328	2,822	2,297	2,372	2,908	751	46
Elm-ash-soft maple	14,185	1,263	1,047	398	1,646	1,943	1,509	2,090	1,098	802	523	1,412	454	--
Maple-birch	73,658	3,057	3,421	1,811	5,875	15,725	18,150	8,408	4,949	5,537	3,153	2,904	668	--
Aspen	70,621	7,881	9,852	3,181	8,333	12,589	12,376	6,014	4,881	2,350	1,558	1,338	268	--
Paper birch	4,722	126	101	312	391	679	1,543	1,005	253	1	311	--	--	--
Exotic	2,275	20	583	1,306	250	61	55	--	--	--	--	--	--	--
Nonstocked	160	9	24	22	--	26	74	--	--	5	--	--	--	--
All types	263,047	16,347	23,079	23,704	27,486	44,848	49,339	26,006	17,790	13,170	9,160	9,572	2,523	23

Table 51.--Net annual growth of sawtimber on commercial forest land by forest type and stand-age class, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	57,415	1,123	2,353	1,905	14,430	16,142	9,234	3,386	6,982	435	1,208	159	58	--
Red pine	55,729	127	2,988	10,903	22,752	8,878	1,380	2,339	1,731	2,439	1,322	870	--	--
White pine	17,188	82	1,531	777	--	1,429	2,395	265	2,559	2,576	3,962	372	1,240	--
Balsam fir	6,665	--	1,034	98	--	931	274	707	49	2,786	--	130	656	--
White spruce	1,714	--	964	--	--	--	32	--	--	994	--	--	--	-276
Black spruce	2,531	958	706	--	--	357	466	--	44	--	--	--	--	--
Northern white-cedar	20,092	25	90	537	728	233	4,410	1,873	2,313	611	1,206	2,922	2,815	2,329
Tamarack	412	--	48	135	--	--	3	147	53	--	--	26	--	--
Oak-hickory	145,574	5,754	3,657	913	5,280	13,251	32,184	21,061	13,452	17,572	8,919	20,452	2,902	177
Elm-ash-soft maple	63,854	8,334	3,585	1,624	5,157	8,449	9,075	7,347	7,194	6,537	1,084	4,477	991	--
Maple-birch	273,090	8,658	7,439	3,283	13,860	47,621	49,869	38,782	26,767	40,880	15,171	17,004	3,756	--
Aspen	243,955	18,803	13,079	8,729	13,447	36,210	47,669	39,372	29,718	15,681	11,820	8,303	1,124	--
Paper birch	12,483	1,066	--	--	870	392	5,384	3,843	736	3	189	--	--	--
Exotic	2,468	--	89	37	1,603	660	79	--	--	--	--	--	--	--
Nonstocked	177	--	--	--	--	102	47	--	--	28	--	--	--	--
All types	903,347	44,930	37,563	28,941	78,127	134,655	162,501	119,122	91,598	90,542	44,881	54,715	13,542	2,230

[1/] International 1/4-inch rule.

Table 52.--Net annual growth of growing stock on commercial forest land by forest type, stand-size class, and basal-area class, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	2,921	--	--	99	128	178	189	991	487	212	227	410	--	--	--
Poletimber	7,848	--	--	88	93	552	428	1,117	1,496	901	1,266	1,483	424	--	--
Sapling & seedling	3,694	18	48	47	458	465	646	589	678	128	130	--	487	--	--
All stands	14,463	18	48	234	679	1,195	1,263	2,697	2,661	1,241	1,623	1,893	911	--	--
Red pine															
Sawtimber	3,517	--	--	--	264	210	--	358	323	233	87	636	428	635	343
Poletimber	22,243	--	--	--	88	184	595	483	1,679	2,067	1,437	2,476	4,811	4,908	3,515
Sapling & seedling	3,624	23	3	42	78	172	1,147	225	1,310	264	--	300	60	--	--
All stands	29,384	23	3	42	430	566	1,742	1,066	3,312	2,564	1,524	3,412	5,299	5,543	3,858
White pine															
Sawtimber	2,739	--	--	--	141	149	--	268	195	605	216	661	--	504	--
Poletimber	941	--	--	--	--	--	94	203	92	318	--	234	--	--	--
Sapling & seedling	286	--	--	41	--	95	54	96	--	--	--	--	--	--	--
All stands	3,966	--	--	41	141	244	148	567	287	923	216	895	--	504	--
Balsam fir															
Sawtimber	437	--	--	--	--	--	130	--	--	--	311	80	--	-84	--
Poletimber	927	--	--	--	--	280	155	42	96	--	--	97	257	--	--
Sapling & seedling	462	--	15	--	--	146	--	--	174	127	--	--	--	--	--
All stands	1,826	--	15	--	--	426	285	42	270	127	311	177	257	-84	--
White spruce															
Sawtimber	36	--	--	--	--	--	--	--	--	--	93	-57	--	--	--
Poletimber	204	--	--	--	--	--	--	--	--	140	--	64	--	--	--
Sapling & seedling	780	--	--	--	159	--	--	--	131	--	--	490	--	--	--
All stands	1,020	--	--	--	159	--	--	--	131	140	93	497	--	--	--
Black spruce															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	676	--	--	25	--	--	--	150	--	71	146	75	--	209	--
Sapling & seedling	173	8	130	--	14	--	--	16	--	--	--	--	5	--	--
All stands	849	8	130	25	14	--	--	166	--	71	146	75	5	209	--
Northern white-cedar															
Sawtimber	-98	--	--	--	--	--	--	40	--	--	193	188	297	326	-1,142
Poletimber	6,735	--	--	--	148	--	250	65	176	148	71	829	2,253	1,720	1,075
Sapling & seedling	985	--	6	--	--	3	--	32	76	--	179	238	299	152	--
All stands	7,622	--	6	--	148	3	250	137	252	148	443	1,255	2,849	2,198	-67

(Table 52 continued on next page)

(Table 52 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	133	--	--	5	3	--	--	--	125	--	--	--	--	--	--
Poletimber	140	--	--	--	--	--	--	-14	--	35	--	119	--	--	--
Sapling & seedling	156	--	--	107	--	--	--	32	17	--	--	--	--	--	--
All stands	429	--	--	112	3	--	--	18	142	35	--	119	--	--	--
Oak-hickory															
Sawtimber	10,543	6	--	25	108	531	562	1,066	1,672	1,282	1,804	2,326	884	277	--
Poletimber	23,819	--	10	--	100	1,308	1,907	2,686	2,750	2,960	3,958	4,631	2,376	1,044	89
Sapling & seedling	3,505	37	414	226	668	781	797	468	45	19	50	--	--	--	--
All stands	37,867	43	424	251	876	2,620	3,266	4,220	4,467	4,261	5,812	6,957	3,260	1,321	89
Elm-ash-soft maple															
Sawtimber	5,155	--	--	53	165	236	296	412	431	33	433	1,229	1,146	375	346
Poletimber	6,319	--	24	23	183	347	163	267	649	378	1,650	1,072	966	434	163
Sapling & seedling	2,711	9	101	261	311	971	524	34	187	--	192	121	--	--	--
All stands	14,185	9	125	337	659	1,554	983	713	1,267	411	2,275	2,422	2,112	809	509
Maple-birch															
Sawtimber	19,262	--	21	--	99	432	413	885	2,177	1,422	2,860	5,230	4,178	982	563
Poletimber	47,180	--	39	70	798	787	1,198	2,910	5,323	3,804	5,499	12,560	10,097	3,832	263
Sapling & seedling	7,216	53	277	294	1,597	997	1,342	1,733	598	69	235	21	--	--	--
All stands	73,658	53	337	364	2,494	2,216	2,953	5,528	8,098	5,295	8,594	17,811	14,275	4,814	826
Aspen															
Sawtimber	14,037	--	--	17	278	525	269	889	1,813	900	1,817	2,757	2,701	1,182	889
Poletimber	37,120	--	--	59	403	2,051	2,254	4,586	4,463	3,779	6,764	4,808	5,673	2,151	129
Sapling & seedling	19,464	112	809	1,360	2,408	3,696	2,153	3,898	1,263	615	1,534	359	1,257	--	--
All stands	70,621	112	809	1,436	3,089	6,272	4,676	9,373	7,539	5,294	10,115	7,924	9,631	3,333	1,018
Paper birch															
Sawtimber	347	--	--	--	--	--	37	--	--	--	310	--	--	--	--
Poletimber	3,836	--	--	--	149	55	120	403	241	291	419	655	1,065	438	--
Sapling & seedling	539	--	6	--	28	67	54	72	--	--	312	--	--	--	--
All stands	4,722	--	6	--	177	122	211	475	241	291	1,041	655	1,065	438	--
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	1,529	--	--	--	--	--	--	--	55	197	401	670	84	122	--
Sapling & seedling	746	--	20	202	114	13	--	--	219	--	165	--	13	--	--
All stands	2,275	--	20	202	114	13	--	--	274	197	566	670	97	122	--
Nonstocked	160	19	117	--	--	--	--	24	--	--	--	--	--	--	--
All types															
Sawtimber	59,029	6	21	199	1,186	2,261	1,896	4,909	7,223	4,687	8,351	13,460	9,634	4,197	999
Poletimber	159,517	--	73	265	1,962	5,564	7,164	12,898	17,020	15,089	21,611	29,773	28,006	14,858	5,234
Sapling & seedling	44,341	260	1,829	2,580	5,835	7,406	6,717	7,195	4,698	1,222	2,797	1,529	2,121	152	0
Nonstocked	160	19	117	--	--	--	--	24	--	--	--	--	--	--	--
All stands	263,047	285	2,040	3,044	8,983	15,231	15,777	25,026	28,941	20,998	32,759	44,762	39,761	19,207	6,233

Table 53.--Net annual growth of sawtimber on commercial forest land by forest type, stand-size class, and basal-area class, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	18,986	--	--	359	391	601	375	6,863	4,580	1,220	2,482	2,115	--	--	--
Poletimber	33,648	--	--	138	196	8,576	617	5,115	6,315	1,042	8,076	1,747	1,826	--	--
Sapling & seedling	4,781	38	82	85	864	2,222	362	982	81	65	--	--	--	--	--
All stands	57,415	38	82	582	1,451	11,399	1,354	12,960	10,976	2,327	10,558	3,862	1,826	--	--
Red pine															
Sawtimber	17,239	--	--	--	1,642	1,077	--	1,176	1,341	1,293	779	4,052	1,430	2,462	1,987
Poletimber	35,956	--	--	--	244	142	706	220	3,968	1,421	93	3,416	7,027	10,612	8,107
Sapling & seedling	2,534	127	19	--	--	92	1,755	231	--	310	--	--	--	--	--
All stands	55,729	127	19	--	1,886	1,311	2,461	1,627	5,309	3,024	872	7,468	8,457	13,074	10,094
White pine															
Sawtimber	13,546	--	--	--	265	884	--	1,411	1,002	3,614	1,067	3,482	--	1,821	--
Poletimber	2,030	--	--	--	--	--	176	--	191	886	--	777	--	--	--
Sapling & seedling	1,612	--	--	180	--	155	315	962	--	--	--	--	--	--	--
All stands	17,188	--	--	180	265	1,039	491	2,373	1,193	4,500	1,067	4,259	--	1,821	--
Balsam fir															
Sawtimber	4,119	--	--	--	--	--	379	--	--	--	666	2,578	--	496	--
Poletimber	1,415	--	--	--	--	114	70	35	126	--	--	88	982	--	--
Sapling & seedling	1,131	--	--	--	--	801	--	--	98	232	--	--	--	--	--
All stands	6,665	--	--	--	--	915	449	35	224	232	666	2,666	982	496	--
White spruce															
Sawtimber	-188	--	--	--	--	--	--	--	--	--	88	-276	--	--	--
Poletimber	938	--	--	--	--	--	--	--	--	32	--	906	--	--	--
Sapling & seedling	964	--	--	--	--	--	--	--	964	--	--	--	--	--	--
All stands	1,714	--	--	--	--	--	--	--	964	32	88	630	--	--	--
Black spruce															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	867	--	--	466	--	--	--	225	--	75	--	57	--	44	--
Sapling & seedling	1,664	--	983	--	654	--	--	27	--	--	--	--	--	--	--
All stands	2,531	--	983	466	654	--	--	252	--	75	--	57	--	44	--
Northern white-cedar															
Sawtimber	8,745	--	--	--	--	--	--	90	--	--	1,580	3,315	1,998	3,394	-1,632
Poletimber	10,558	--	--	--	20	--	46	813	724	785	41	1,183	3,631	2,702	613
Sapling & seedling	789	--	29	--	--	--	--	12	73	--	353	13	309	--	--
All stands	20,092	--	29	--	20	--	46	915	797	785	1,974	4,511	5,938	6,096	-1,019

(Table 53 continued on next page)

(Table 53 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	225	--	--	53	26	--	--	--	146	--	--	--	--	--	--
Poletimber	51	--	--	--	--	--	--	--	--	48	--	3	--	--	--
Sapling & seedling	136	--	--	--	--	--	--	139	-3	--	--	--	--	--	--
All stands	412	--	--	53	26	--	--	139	143	48	--	3	--	--	--
Oak-hickory															
Sawtimber	60,771	32	--	738	506	1,641	3,245	6,230	8,352	14,445	8,808	7,904	8,058	812	--
Poletimber	75,352	--	16	--	25	2,243	4,432	6,319	10,077	8,579	12,564	17,435	9,862	3,785	15
Sapling & seedling	9,451	127	897	306	1,395	2,797	1,734	1,793	148	32	222	--	--	--	--
All stands	145,574	159	913	1,044	1,926	6,681	9,411	14,342	18,577	23,056	21,594	25,339	17,920	4,597	15
Elm-ash-soft maple															
Sawtimber	30,352	--	--	134	394	3,071	3,389	2,027	900	100	3,744	8,647	6,857	1,029	60
Poletimber	19,916	--	51	71	19	502	995	1,111	1,601	1,370	3,514	4,371	3,103	2,326	882
Sapling & seedling	13,586	21	141	792	1,962	4,894	3,567	-28	2,129	--	71	37	--	--	--
All stands	63,854	21	192	997	2,375	8,467	7,951	3,110	4,630	1,470	7,329	13,055	9,960	3,355	942
Maple-birch															
Sawtimber	121,505	--	102	--	297	1,572	3,059	6,441	12,020	5,879	17,873	32,471	29,898	10,089	1,804
Poletimber	133,351	--	--	50	1,064	2,976	4,425	10,965	5,244	9,512	8,890	40,595	31,745	16,641	1,244
Sapling & seedling	18,234	114	356	2,490	3,073	2,862	4,545	2,278	1,202	182	1,118	14	--	--	--
All stands	273,090	114	458	2,540	4,434	7,410	12,029	19,684	18,466	15,573	27,881	73,080	61,643	26,730	3,048
Aspen															
Sawtimber	98,434	--	--	23	704	2,038	2,389	10,306	13,918	8,824	14,166	14,880	18,003	6,967	6,216
Poletimber	107,465	--	--	39	3,811	2,655	2,273	10,085	8,381	9,077	15,382	14,307	30,205	6,853	4,397
Sapling & seedling	38,056	278	3,026	2,493	4,411	9,598	5,012	6,847	4,631	480	691	251	338	--	--
All stands	243,955	278	3,026	2,555	8,926	14,291	9,674	27,238	26,930	18,381	30,239	29,438	48,546	13,820	10,613
Paper birch															
Sawtimber	270	--	--	--	--	--	81	--	--	--	189	--	--	--	--
Poletimber	11,146	--	--	--	94	80	28	1,320	153	92	337	1,744	3,964	3,334	--
Sapling & seedling	1,067	--	--	--	--	--	54	1,013	--	--	--	--	--	--	--
All stands	12,483	--	--	--	94	80	163	2,333	153	92	526	1,744	3,964	3,334	--
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	2,342	--	--	--	--	--	--	--	79	--	57	1,487	--	719	--
Sapling & seedling	126	--	--	--	--	--	--	--	80	--	46	--	--	--	--
All stands	2,468	--	--	--	--	--	--	--	159	--	103	1,487	--	719	--
Nonstocked	177	--	177	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	374,004	32	102	1,307	4,225	10,884	12,917	34,544	42,259	35,375	51,442	79,168	66,244	27,070	8,435
Poletimber	435,035	--	67	764	5,473	17,288	13,768	36,208	36,859	32,919	48,954	88,116	92,345	47,016	15,258
Spling & seedling	94,131	705	5,533	6,346	12,359	23,421	17,344	14,256	9,403	1,301	2,501	315	647	--	--
Nonstocked	177	--	177	--	--	--	--	--	--	--	--	--	--	--	--
All stands	903,347	737	5,879	8,417	22,057	51,593	44,029	85,008	88,521	69,595	102,897	167,599	159,236	74,086	23,693

1/International 1/4-inch rule.

Table 54.--Timber removals[1/] from growing stock on commercial forest land by species group and county, Northern Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	872	107	5	3	6	11	3	5	24	7	123	3
Red pine	3,105	118	14	17	4	9	5	9	66	18	146	11
Jack pine	7,999	192	169	8	9	--	--	--	377	188	1,014	1
White spruce	87	5	38	--	--	--	--	3	18	--	--	1
Black spruce	88	4	1	3	--	--	1	3	12	--	3	4
Balsam fir	842	12	175	3	2	--	--	5	136	4	3	6
Hemlock	185	3	1	25	--	--	5	22	6	--	1	10
Tamarack	438	2	16	5	6	--	22	14	45	26	6	35
Northern white-cedar	1,633	32	290	14	3	--	5	62	212	21	9	32
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--
Total	15,249	475	709	78	30	20	41	123	896	264	1,305	103
HARDWOODS												
Select white oaks	3,006	123	22	2	16	13	8	1	3	242	67	3
Select red oaks	11,720	781	219	145	146	40	45	8	69	406	676	16
Other red oaks	3,541	175	--	--	36	--	--	--	8	151	117	--
Hickory	15	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	40	--	--	1	--	--	1	8	15	--	--	2
Hard maple	5,310	40	48	442	19	10	251	370	348	104	66	413
Soft maple	8,839	287	505	86	139	32	183	90	507	422	138	126
Beech	1,539	30	8	63	2	--	69	74	118	28	39	197
Ash	2,090	70	77	190	36	7	44	50	156	46	99	94
Balsam poplar	784	134	74	4	5	1	--	5	150	4	2	18
Cottonwood	454	--	--	--	53	2	--	--	--	21	9	--
Bigtooth aspen	25,206	2,051	802	274	304	22	306	182	1,824	2,160	1,029	424
Quaking aspen	20,023	1,900	546	85	244	7	286	205	1,979	1,406	581	384
Basswood	1,980	22	8	173	3	1	109	105	244	33	29	203
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--
Elm	1,731	29	79	207	15	4	50	77	104	3	38	62
Paper birch	2,579	233	110	28	19	4	41	39	253	99	65	44
Other hardwoods[2/]	418	11	--	5	2	--	45	3	2	24	11	13
Total	89,275	5,886	2,498	1,705	1,039	143	1,438	1,217	5,780	5,149	2,966	1,999
All species	104,524	6,361	3,207	1,783	1,069	163	1,479	1,340	6,676	5,413	4,271	2,102

(Table 54 continued on next page)

[1/] Removals in 1979 are trend-level removals.

[2/] Includes black cherry.

(Table 54 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	9	25	62	2	13	10	18	7	3	5	7	12
Red pine	11	8	122	6	42	32	2	94	172	210	6	39
Jack pine	6	146	749	--	225	597	10	3	2	--	50	34
White spruce	--	--	2	--	--	--	--	--	--	1	--	--
Black spruce	--	--	2	--	3	--	10	--	--	--	--	2
Balsam fir	4	--	4	--	5	--	--	--	--	--	--	3
Hemlock	--	3	2	2	5	3	37	2	1	4	1	2
Tamarack	--	59	35	5	2	--	10	16	--	--	--	16
Northern white-cedar	4	15	27	7	11	18	7	9	5	7	--	15
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--
Total	34	256	1,005	22	306	660	94	131	183	227	64	123
HARDWOODS												
Select white oaks	82	17	62	72	52	357	1	82	146	179	180	80
Select red oaks	345	32	152	172	293	1,113	145	299	332	392	410	136
Other red oaks	63	--	208	22	--	528	--	200	276	130	7	2
Hickory	--	--	--	3	--	--	--	--	--	3	3	--
Yellow birch	--	--	--	--	1	--	--	--	--	--	--	--
Hard maple	36	130	55	151	159	83	311	122	114	212	92	115
Soft maple	306	89	156	175	169	363	95	411	400	231	510	159
Beech	3	17	2	17	40	37	50	43	59	40	32	49
Ash	36	25	45	69	108	31	41	47	16	72	106	37
Balsam poplar	18	5	12	4	--	1	--	--	1	--	7	2
Cottonwood	62	--	48	31	--	--	--	--	--	16	191	--
Bigtooth aspen	903	191	391	382	390	792	18	241	630	663	688	480
Quaking aspen	860	167	311	186	342	436	3	396	387	217	335	303
Basswood	19	41	1	48	5	46	63	20	52	44	59	61
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--
Elm	35	58	66	2	63	24	72	48	16	29	12	54
Paper birch	141	22	43	21	50	19	6	25	30	12	92	38
Other hardwoods	3	16	9	1	8	22	13	35	16	12	3	17
Total	2,912	810	1,561	1,356	1,680	3,852	818	1,969	2,475	2,252	2,727	1,533
All species	2,946	1,066	2,566	1,378	1,986	4,512	912	2,100	2,658	2,479	2,791	1,656

(Table 54 continued on next page)

(Table 54 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	19	111	20	29	27	27	15	34	33	87
Red pine	48	448	125	37	266	46	36	58	102	778
Jack pine	477	3	3	265	--	994	314	285	1,010	868
White spruce	4	--	--	1	1	1	1	10	1	--
Black spruce	6	--	--	--	1	--	11	14	3	5
Balsam fir	167	--	--	3	3	8	8	280	6	5
Hemlock	1	4	4	--	18	2	7	7	1	6
Tamarack	35	14	3	1	6	2	6	29	16	6
Northern white-cedar	162	7	7	19	23	11	17	518	45	19
Other softwoods	--	--	--	--	--		--	--	--	--
Total	919	587	162	355	345	1,091	415	1,235	1,217	1,774
HARDWOODS										
Select white oaks	74	435	208	45	174	105	11	16	66	62
Select red oaks	593	1,114	495	400	968	459	223	34	847	215
Other red oaks	5	1,002	260	19	--	200	41	--	11	80
Hickory	--	3	--	--	3	--	--	--	--	--
Yellow birch	--	--	--	--	1	--	10	--	--	1
Hard maple	73	223	396	45	242	38	286	144	38	134
Soft maple	444	429	427	137	493	205	287	171	186	481
Beech	50	59	101	12	108	9	102	26	6	49
Ash	59	120	59	24	140	34	107	14	4	27
Balsam poplar	114	4	2	14	2	37	15	141	6	2
Cottonwood	--	11	7	--	3	--	--	--	--	
Bigtooth aspen	1,869	991	842	1,176	915	968	864	590	1,054	790
Quaking aspen	2,109	526	491	521	914	1,008	696	983	708	501
Basswood	45	51	126	31	63	19	114	116	4	22
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--
Elm	49	15	10	53	21	28	183	81	54	90
Paper birch	258	13	18	105	49	112	161	333	51	45
Other hardwoods	2	33	16	11	29	10	9	--	9	28
Total	5,744	5,029	3,458	2,593	4,125	3,232	3,109	2,649	3,044	2,527
All species	6,663	5,616	3,620	2,948	4,470	4,323	3,524	3,884	4,261	4,301

Table 55.--Timber removals[1/] from sawtimber on commercial forest land by species group and county, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[2/]

Species group	All counties	County										
		Alcona	Alpena	Antrim	Arenac	Bay	Benzie	Charlevoix	Cheboygan	Clare	Crawford	Emmet
SOFTWOODS												
White pine	4,749	593	24	16	34	65	16	19	115	33	696	17
Red pine	10,636	634	56	98	24	57	26	53	245	92	816	64
Jack pine	20,583	431	402	18	37	1	--	--	934	597	2,567	4
White spruce	316	18	104	--	--	--	--	14	75	--	--	5
Black spruce	113	3	1	--	--	--	--	--	16	--	2	1
Balsam fir	3,264	22	617	4	3	--	--	7	589	12	8	9
Hemlock	805	6	2	134	--	--	18	119	27	--	2	48
Tamarack	185	1	5	2	2	--	7	5	50	8	2	12
Northern white-cedar	3,627	27	682	8	2	--	3	54	543	25	5	28
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--
Total	44,278	1,735	1,893	280	102	123	70	271	2,594	767	4,098	188
HARDWOODS												
Select white oaks	9,022	290	59	7	81	66	7	1	2	319	93	19
Select red oaks	38,084	1,661	575	753	696	207	75	9	122	1,196	2,748	68
Other red oaks	11,073	367	--	--	171	--	--	--	14	440	474	--
Hickory	93	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	188	--	--	1	--	--	1	47	80	--	--	6
Hard maple	25,517	151	174	2,259	98	58	1,182	1,925	1,756	531	294	1,987
Soft maple	26,621	707	1,553	411	675	152	360	298	1,244	1,314	343	445
Beech	7,967	150	30	333	11	--	352	429	632	93	203	1,095
Ash	8,784	224	145	956	158	27	206	248	564	169	500	475
Balsam poplar	2,701	308	208	21	19	4	--	26	644	16	10	96
Cottonwood	2,332	--	--	--	269	8	--	--	--	102	65	--
Bigtooth aspen	63,600	5,243	1,816	1,013	1,183	73	456	435	5,273	5,362	2,990	1,298
Quaking aspen	63,275	4,841	1,244	399	1,153	29	615	585	7,412	4,668	2,169	1,535
Basswood	9,760	91	11	883	19	4	527	535	1,236	140	141	1,057
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--
Elm	5,975	95	262	803	46	13	163	284	411	9	152	231
Paper birch	5,208	421	140	113	57	1	68	55	602	151	150	105
Other hardwoods[3/]	806	13	2	10	3	--	169	3	10	25	16	19
Total	281,006	14,562	6,219	7,962	4,639	642	4,181	4,880	20,002	14,535	10,348	8,436
All species	325,284	16,297	8,112	8,242	4,741	765	4,251	5,151	22,596	15,302	14,446	8,624

(Table 55 continued on next page)

1/ Removals in 1979 are trend-level removals.
2/ International 1/4-inch rule.
3/ Includes black cherry.

(Table 55 continued)

Species group	County											
	Gladwin	Grand Traverse	Iosco	Isabella	Kalkaska	Lake	Leelanau	Manistee	Mason	Mecosta	Midland	Missaukee
SOFTWOODS												
White pine	44	138	352	10	72	37	99	31	15	21	30	57
Red pine	66	36	483	28	178	159	12	260	469	556	37	115
Jack pine	28	314	1,658	2	665	1,609	23	6	4	--	242	75
White spruce	--	--	10	--	--	--	--	--	--	5	--	--
Black spruce	--	--	--	--	1	--	52	--	--	--	--	--
Balsam fir	17	--	6	--	7	--	--	--	--	--	--	6
Hemlock	--	8	5	5	20	8	206	5	2	12	2	6
Tamarack	--	19	12	2	1	--	3	5	--	--	--	5
Northern white-cedar	16	9	16	4	6	10	4	5	3	4	--	11
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--
Total	171	524	2,542	51	950	1,823	399	312	493	598	311	275
HARDWOODS												
Select white oaks	341	29	179	346	244	1,110	3	81	447	820	892	261
Select red oaks	1,248	76	414	830	1,373	2,869	742	491	852	1,788	2,033	457
Other red oaks	228	--	562	106	--	1,354	--	324	704	593	35	7
Hickory	--	--	--	18	--	--	--	--	--	21	18	--
Yellow birch	--	--	--	--	1	--	--	--	--	--	--	--
Hard maple	191	553	227	847	730	405	1,534	439	587	1,099	518	460
Soft maple	1,104	225	645	858	409	900	485	760	1,026	1,055	2,114	432
Beech	7	74	10	96	209	193	266	209	309	195	175	236
Ash	131	113	174	348	536	91	169	192	36	305	520	161
Balsam poplar	82	26	43	15	--	5	--	--	5	--	25	10
Cottonwood	321	--	243	157	--	--	--	--	--	83	975	--
Bigtooth aspen	2,681	358	1,400	743	806	1,737	59	364	1362	1419	2,190	1,160
Quaking aspen	3,227	381	1,371	457	957	1,189	18	862	1001	595	1,392	951
Basswood	71	197	10	247	10	238	320	76	240	219	293	275
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--
Elm	101	184	221	8	200	69	268	154	46	93	33	175
Paper birch	265	23	122	28	73	26	21	34	43	19	232	50
Other hardwoods	3	65	9	--	7	45	59	55	30	14	2	44
Total	10,001	2,304	5,630	5,104	5,555	10,231	3,944	4,041	6,688	8,318	11,447	4,679
All species	10,172	2,828	8,172	5,155	6,505	12,054	4,343	4,353	7,181	8,916	11,758	4,954

(Table 55 continued on next page)

(Table 55 continued)

Species group	County									
	Montmorency	Newaygo	Oceana	Ogemaw	Osceola	Oscoda	Otsego	Presque Isle	Roscommon	Wexford
SOFTWOODS										
White pine	108	621	108	168	153	145	57	190	176	489
Red pine	249	1,220	348	205	809	238	152	284	561	2,006
Jack pine	1,202	6	7	612	--	2,248	738	650	3,628	1,875
White spruce	23	--	--	4	4	5	5	40	4	--
Black spruce	4	----	--	--	--	2	7	18	--	6
Balsam fir	757	--	--	4	4	16	13	1138	11	14
Hemlock	2	10	10	--	85	3	16	18	6	20
Tamarack	11	5	1	5	2	1	2	10	5	2
Northern white-cedar	518	4	11	11	14	7	12	1544	28	13
Other softwoods	--	--	--	--	--	--	--	--	--	--
Total	2,874	1,866	485	1,009	1,071	2,665	1,002	3,892	4,419	4,425
HARDWOODS										
Select white oaks	135	1187	853	116	719	96	6	67	93	53
Select red oaks	986	4,157	2,076	1,266	4,115	1,229	805	52	1,813	302
Other red oaks	8	3,726	1,088	60	--	531	148	--	23	110
Hickory	--	18	--	--	18	--	--	--	--	--
Yellow birch	--	--	--	--	1	--	51	--	--	--
Hard maple	287	1,115	2,162	172	1,115	138	1,308	577	164	474
Soft maple	987	1,741	1,853	410	1,129	408	739	427	467	945
Beech	261	281	541	61	528	37	538	141	29	243
Ash	111	519	265	87	606	111	535	20	13	69
Balsam poplar	299	21	10	53	10	77	61	574	23	10
Cottonwood	--	59	34	--	16	--	--	--	--	--
Bigtooth aspen	4,641	2,220	1,774	4,016	2,218	2,130	2,130	1,414	2,304	1,332
Quaking aspen	6,911	1,601	1,364	2,282	2,867	2,820	2,219	3,020	2,009	1,131
Basswood	213	256	618	148	310	89	594	594	15	83
Yellow-poplar	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--
Black cherry	--	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--
Elm	182	46	30	172	73	91	641	264	179	276
Paper birch	601	21	24	293	84	246	392	590	78	80
Other hardwoods	2	35	16	15	51	15	13	--	14	42
Total	15,624	17,003	12,708	9,151	13,860	8,018	10,180	7,740	7,224	5,150
All species	18,498	18,869	13,193	10,160	14,931	10,683	11,182	11,632	11,643	9,575

Table 56.--Timber removals[1] from growing stock and sawtimber on commercial forest land by species group, Northern Lower Peninsula, Michigan, [2]1965 and 1979

Species group	Growing stock		Sawtimber	
	[2]1965	1979	[2]1965	1979
	Thousand cubic feet		[3]Thousand board feet	
SOFTWOODS				
White pine	387	872	1,964	4,749
Red pine	1,133	3,105	4,244	10,636
Jack pine	9,574	7,999	24,592	20,583
White spruce	113	87	576	316
Black spruce	145	88	91	113
Balsam fir	415	842	1,142	3,264
Hemlock	185	185	821	805
Tamarack	683	438	278	185
Northern white-cedar	1,976	1,633	2,064	3,627
Other softwoods	--	--	--	--
Total	14,611	15,249	35,772	44,278
HARDWOODS				
Select white oaks	809	3,006	3,243	9,022
Select red oaks	6,826	11,720	22,729	38,084
Other red oaks	1,211	3,541	4,407	11,073
Hickory	[4]	15	[4]	93
Yellow birch	47	40	267	188
Hard maple	1,914	5,310	8,962	25,517
Soft maple	3,082	8,839	9,848	26,621
Beech	1,421	1,539	8,142	7,967
Ash	454	2,090	2,254	8,784
Balsam poplar	273	784	1,489	2,701
Cottonwood	130	454	837	2,332
Bigtooth aspen	19,444	25,206	60,304	63,600
Quaking aspen	19,115	20,023	59,098	63,275
Basswood	959	1,980	5,440	9,760
Yellow-poplar	--	--	--	--
Black walnut	--	--	--	--
Butternut	--	--	--	--
Elm	3,514	1,731	20,143	5,975
Paper birch	3,178	2,579	7,676	5,208
Other hardwoods[5]	718	418	3,493	806
Total	63,095	89,275	218,332	281,006
All species	77,706	104,524	254,104	325,284

[1]Removals in 1979 are trend-level removals.

[2]Figures have been adjusted from those published after the 1966 survey to conform 1980 volumes because of changes in survey definitions and procedures.

[3]International 1/4-inch rule.

[4]Included in other hardwoods.

[5]Includes black cherry in 1965 and 1979 and hickory in 1965.

Table 57.--Timber removals[1] from growing stock and sawtimber on commercial forest land by item and species category, Northern Lower Peninsula, Michigan, 1979

Item	Growing stock						Sawtimber					
	All species	Pine	Other softwoods	Aspen	Hard maple	Other hardwoods	All species	Pine	Other softwoods	Aspen	Hard maple	Other hardwoods
	Thousand cubic feet						[2] Thousand board feet					
ROUNDWOOD PRODUCTS												
Pulpwood	39,720	8,372	107	18,859	197	12,185	64,465	19,342	285	31,745	525	12,568
Saw logs	38,329	2,520	997	15,134	3,121	16,557	202,656	14,146	5,230	73,764	18,986	90,530
Fuelwood	3,158	9	2	308	988	1,851	10,421	59	8	1,005	3,240	6,109
Posts	390	--	390	--	--	--	407	--	407	--	--	--
Veneer logs	318	--	--	47	79	192	2,295	--	--	342	566	1,387
Poles	25	25	--	--	--	--	99	99	--	--	--	--
Other[3]	7,585	220	296	5,894	[4]	1,175	13,007	678	959	10,137	[4]	1,233
Total	89,525	11,146	1,792	40,242	4,385	31,960	293,350	34,324	6,889	116,993	23,317	111,827
LOGGING RESIDUE	6,167	452	201	2,232	474	2,808	10,401	443	438	1,902	1,307	6,311
OTHER REMOVALS	8,832	378	1,280	2,755	451	3,968	21,533	1,201	983	7,980	893	10,476
TOTAL REMOVALS	104,524	11,976	3,273	45,229	5,310	38,736	325,284	35,968	8,310	126,875	25,517	128,614

[1] Removals in 1979 are trend-level removals.
[2] International 1/4-inch rule.
[3] Includes charcoal wood, shingle bolts, cabin logs, particleboard bolts, pilings, etc.
[4] Less than 500 cubic feet.

Table 58.--Net annual growth and removals[1/] of growing stock on commercial forest land by species group, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	Net annual growth	Annual timber removals
SOFTWOODS		
White pine	7,359	872
Red pine	32,209	3,105
Jack pine	14,588	7,999
White spruce	2,483	87
Black spruce	1,081	88
Balsam fir	1,591	842
Hemlock	1,360	185
Tamarack	-1,568	438
Northern white-cedar	14,711	1,633
Other softwoods	2,584	--
Total	76,398	15,249
HARDWOODS		
Select white oaks	5,645	3,006
Select red oaks	21,281	11,720
Other red oaks	4,565	3,541
Hickory	50	15
Yellow birch	799	40
Hard maple	23,690	5,310
Soft maple	42,752	8,839
Beech	1,378	1,539
Ash	13,059	2,090
Balsam poplar	1,226	784
Cottonwood	322	454
Bigtooth aspen	28,441	25,206
Quaking aspen	20,759	20,023
Basswood	9,876	1,980
Yellow-poplar	--	--
Black walnut	3	--
Butternut	7	--
Elm	-2,502	1,731
Paper birch	9,155	2,579
Other hardwoods[2/]	6,143	418
Total	186,649	89,275
All species	263,047	104,524

1/Removals in 1979 are trend-level removals.

2/Includes black cherry.

Table 59.--Net annual growth and removals[1/] of sawtimber on commercial forest land by species group, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[2/]

Species group	Net annual growth	Annual timber removals
SOFTWOODS		
White pine	39,030	4,749
Red pine	73,439	10,636
Jack pine	56,093	20,583
White spruce	7,748	316
Black spruce	-55	113
Balsam fir	7,348	3,264
Hemlock	5,597	805
Tamarack	-1,882	185
Northern white-cedar	32,964	3,627
Other softwoods	4,288	--
Total	224,570	44,278
HARDWOODS		
Select white oaks	25,985	9,022
Select red oaks	113,864	38,084
Other red oaks	17,573	11,073
Hickory	128	93
Yellow birch	3,846	188
Hard maple	69,970	25,517
Soft maple	109,124	26,621
Beech	2,969	7,967
Ash	38,964	8,784
Balsam poplar	10,606	2,701
Cottonwood	1,025	2,332
Bigtooth aspen	111,076	63,600
Quaking aspen	90,673	63,275
Basswood	50,875	9,760
Yellow-poplar	--	--
Black walnut	--	--
Butternut	43	--
Elm	-1,315	5,975
Paper birch	19,022	5,208
Other hardwoods[3/]	14,349	806
Total	678,777	281,006
All species	903,347	325,284

1/Removals in 1979 are trend-level removals.

2/International 1/4-inch rule.

3/Includes black cherry.

Table 60.--Net annual growth and removals[1] of growing stock on commercial forest land by ownership class and softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	30,724	17,660	13,064	11,709	3,676	8,033
Bureau of Land Mgmt.	--	--	--	--	--	--
Miscellaneous federal	192	42	150	9	3	6
Indian	--	--	--	--	--	--
State	69,372	22,597	46,775	18,486	4,337	14,149
County and municipal	1,854	376	1,478	52	8	44
Forest industry	2,840	507	2,333	2,074	8	2,066
Farmer	51,799	12,662	39,137	[2]/72,194	[2]/7,217	[2]/64,977
Misc. private-corp.	18,311	4,154	14,157	--	--	--
Misc. private-indiv.	87,955	18,400	69,555	--	--	--
All owners	263,047	76,398	186,649	104,524	15,249	89,275

[1]/Removals in 1979 are trend-level removals.

[2]/Includes miscellaneous private-corporation and miscellaneous private-individual.

Table 61.--Net annual growth and removals[1] of sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[2]

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	85,037	48,425	36,612	26,058	9,063	16,995
Bureau of Land Mgmt.	--	--	--	--	--	--
Miscellaneous federal	23	23	--	17	4	13
Indian	--	--	--	--	--	--
State	231,770	71,165	160,605	49,808	12,392	37,416
County and municipal	8,639	2,087	6,552	128	10	118
Forest industry	9,637	890	8,747	3,376	4	3,372
Farmer	173,729	33,855	139,874	[3]/245,897	[3]/22,805	[3]/223,092
Misc. private-corp.	62,936	11,317	51,619	--	--	--
Misc. private-indiv.	331,576	56,808	274,768	--	--	--
All owners	903,347	224,570	678,777	325,284	44,278	281,006

[1]/Removals in 1979 are trend-level removals.

[2]/International 1/4-inch rule.

[3]/Includes miscellaneous private-corporation and miscellaneous private-individual.

Table 62.--Annual mortality of growing stock on commercial forest land by softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1965[1/] and 1979

(In million cubic feet)

Species	1965[1/]	1979
Softwoods	5.8	10.0
Hardwoods	19.6	41.5
Total	25.4	51.5

1/Figures have been adjusted from those published after the 1965 survey to conform to 1979 volumes because of changes in survey definitions and procedures

Table 63.--Annual mortality of growing stock on commercial forest land by species group and cause, Northern Lower Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All causes	Cause						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
SOFTWOODS								
White pine	227	--	73	--	--	24	10	120
Red pine	50	--	33	--	--	0	--	17
Jack pine	1,426	21	214	--	31	43	31	1,086
White spruce	319	--	27	--	--	35	--	257
Black spruce	493	--	158	--	--	13	--	322
Balsam fir	4,115	226	905	--	--	379	29	2,576
Hemlock	88	--	3	--	--	3	--	82
Tamarack	2,053	--	129	--	--	--	--	1,924
Northern white-cedar	1,069	--	294	--	--	461	31	283
Other softwoods	122	--	--	--	--	--	--	122
Total	9,962	247	1,836	--	31	958	101	6,789
HARDWOODS								
Select white oaks	588	--	113	--	--	--	--	475
Select red oaks	3,255	137	511	--	--	88	68	2,451
Other red oaks	720	--	--	--	--	--	--	720
Hickory	3	--	--	--	--	--	--	3
Yellow birch	244	--	--	--	--	--	--	244
Hard maple	2,988	--	1,671	--	--	--	149	1,168
Soft maple	1,579	--	283	--	--	392	--	904
Beech	1,635	--	--	--	--	--	--	1,635
Ash	1,462	263	366	--	--	358	73	402
Balsam poplar	2,114	--	765	--	--	311	--	1,038
Cottonwood	15	--	--	--	--	--	--	15
Bigtooth aspen	8,634	--	3,928	--	--	656	95	3,955
Quaking aspen	11,963	--	4,367	--	72	2,369	--	5,155
Basswood	1,154	--	317	--	--	72	--	765
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	1	--	--	--	--	--	--	1
Black cherry	9	--	1	--	--	--	--	8
Butternut	1	--	--	--	--	--	--	1
Elm	4,238	13	3,215	--	9	13	--	988
Paper birch	892	--	202	--	--	24	--	666
Other hardwoods	66	--	66	--	--	--	--	--
Total	41,561	413	15,805	--	81	4,283	385	20,594
All species	51,523	660	17,641	--	112	5,241	486	27,383

Table 64.--Annual mortality of sawtimber on commercial forest land by species group and cause, Northern Lower Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All causes	Cause						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
SOFTWOODS								
White pine	856	--	249	--	--	134	--	473
Red pine	--	--	--	--	--	--	--	--
Jack pine	4,166	111	661	--	148	149	206	2,891
White spruce	1,258	--	184	--	--	--	--	1,074
Black spruce	1,001	--	1,001	--	--	--	--	--
Balsam fir	8,542	499	1,684	--	--	971	--	5,388
Hemlock	243	--	12	--	--	8	--	223
Tamarack	4,053	--	--	--	--	--	--	4,053
Northern white-cedar	1,466	--	596	--	--	353	--	517
Other softwoods	15	--	--	--	--	--	--	15
Total	21,600	610	4,387	--	148	1,615	206	14,634
HARDWOODS								
Select white oaks	775	--	775	--	--	--	--	--
Select red oaks	9,657	--	2,595	--	--	--	--	7,062
Other red oaks	1,861	--	--	--	--	--	--	1,861
Hickory	9	--	--	--	--	--	--	9
Yellow birch	574	--	--	--	--	--	--	574
Hard maple	4,820	--	2,937	--	--	--	--	1,883
Soft maple	2,858	--	281	--	--	823	--	1,754
Beech	5,405	--	--	--	--	--	--	5,405
Ash	2,295	--	2,295	--	--	--	--	--
Balsam poplar	7,413	--	2,710	--	--	1,849	--	2,854
Cottonwood	57	--	--	--	--	--	--	57
Bigtooth aspen	17,919	--	9,235	--	--	1,632	--	7,052
Quaking aspen	27,046	--	9,991	--	--	5,680	--	11,375
Basswood	2,945	--	743	--	--	--	--	2,202
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	--	--	--	--	--	--
Butternut	5	--	--	--	--	--	--	5
Elm	5,372	29	4,181	--	--	29	--	1,133
Paper birch	896	--	128	--	--	124	--	644
Other hardwoods	160	--	160	--	--	--	--	--
Total	90,067	29	36,031	--	--	10,137	--	43,870
All species	111,667	639	40,418	--	148	11,752	206	58,504

[1/]International 1/4-inch rule.

Table 65.--Annual mortality of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Northern Lower Peninsula, Michigan, 1979

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	- - - Thousand cubic feet- - -			- - - [1/] Thousand board feet- - -		
National Forest	2,864	777	2,087	8,279	2,531	5,748
Bureau of Land Management	--	--	--	--	--	--
Miscellaneous federal	68	2	66	1	1	--
Indian	--	--	--	--	--	--
State	13,296	3,191	10,105	24,965	5,696	19,269
County and municipal	272	23	249	513	39	474
Forest industry	616	173	443	1,560	435	1,125
Farmer	11,650	2,217	9,433	26,037	3,779	22,258
Misc. private-corp.	4,219	1,080	3,139	11,780	4,216	7,564
Misc. private-indiv.	18,538	2,499	16,039	38,532	4,903	33,629
All owners	51,523	9,962	41,561	111,667	21,600	90,067

[1/] International 1/4-inch rule.

Table 66.--Output of timber products by product, softwoods and hardwoods, and source of material, Northern Lower Peninsula, Michigan, 1978

Product	Standard units	Total		Roundwood products: Growing stock		Roundwood products: Nongrowing stock		Plant byproducts	
		No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet
PULPWOOD									
Softwood	1/Standard	126,891	10,010	107,489	8,479	15,060	1,188	4,342	343
Hardwood	cords	489,459	38,613	396,056	31,241	55,755	4,398	37,648	2,974
Total		616,350	48,623	503,545	39,720	70,815	5,586	41,990	3,317
SAW LOGS									
Softwood	2/Thousand	20,569	3,646	19,841	3,517	728	129	--	--
Hardwood	board feet	206,583	35,914	200,244	34,812	6,339	1,102	--	--
Total		227,152	39,560	220,085	38,329	7,067	1,231	--	--
VENEER LOGS									
Softwood	2/Thousand	--	--	--	--	--	--	--	--
Hardwood	board feet	2,295	318	2,295	318	--	--	--	--
Total		2,295	318	2,295	318	--	--	--	--
FUELWOOD									
Softwood	1/Standard	12,729	871	213	11	873	45	11,643	815
Hardwood	cords	245,457	17,133	45,146	3,147	121,897	8,497	78,414	5,489
Total		258,186	18,004	45,359	3,158	122,770	8,542	90,057	6,304
POSTS									
Softwood	Thousand	422	425	387	390	35	35	--	--
Hardwood	pieces	--	--	--	--	--	--	--	--
Total		422	425	387	390	35	35	--	--
POLES									
Softwood	Pieces	2,908	25	2,908	25	--	--	--	--
Hardwood		--	--	--	--	--	--	--	--
Total		2,908	25	2,908	25	--	--	--	--
OTHER 3/									
Softwood	Thousand	808	808	516	516	49	49	243	243
Hardwood	cubic feet	12,254	12,254	7,069	7,069	946	946	4,239	4,239
Total		13,062	13,062	7,585	7,585	995	995	4,482	4,482
ALL PRODUCTS									
Softwood	Thousand	--	15,785	--	12,938	--	1,446	--	1,401
Hardwood	cubic feet	--	104,232	--	76,587	--	14,943	--	12,702
Total		--	120,017	--	89,525	--	16,389	--	14,103

1/Rough-wood, 128 cubic foot basis.

2/International 1/4-inch rule.

3/Other (industrial production) includes cabin logs, charcoal wood, particleboard bolts, shingle bolts, pilings, etc.

Table 67.--Output of roundwood products by product, softwoods and hardwoods, and source of material, Northern Lower Peninsula, Michigan, 1978

(In thousand cubic feet)

Product and species group	All sources	Growing-stock trees			Rough and rotten trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
INDUSTRIAL PRODUCTS							
Saw logs							
Softwood	3,646	3,517	3,466	51	4	51	74
Hardwood	35,914	34,812	31,837	2,975	310	164	628
Subtotal	39,560	38,329	35,303	3,026	314	215	702
Veneer logs and bolts							
Softwood	--	--	--	--	--	--	--
Hardwood	318	318	318	--	--	--	--
Subtotal	318	318	318	--	--	--	--
Pulpwood							
Softwood	9,667	8,479	5,013	3,466	189	354	645
Hardwood	35,639	31,241	11,829	19,412	1,700	540	2,158
Subtotal	45,306	39,720	16,842	22,878	1,889	894	2,803
Cooperage							
Softwood	--	--	--	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	--	--	--	--	--	--	--
Piling							
Softwood	2	2	2	--			
Hardwood	--	--	--	--	--	--	--
Subtotal	2	2	2	--	--	--	--
Poles					--	--	--
Softwood	25	25	20	5			
Hardwood	--	--	--	--	--	--	--
Subtotal	25	25	20	5	--	--	--
Mine timbers (Round)					--	--	--
Softwood	--	--	--	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	--	--	--	--	--	--	--
Posts (Round and split)							
Softwood	425	390	101	289	3	--	32
Hardwood	--	--	--	--	--	--	--
Subtotal	425	390	101	289	3	--	32
Other							
Softwood	563	514	330	184	--	7	42
Hardwood	8,015	7,069	2,796	4,273	255	81	610
Subtotal	8,578	7,583	3,126	4,457	255	88	652
All industrial products							
Softwood	14,328	12,927	8,932	3,995	196	412	793
Hardwood	79,886	73,440	46,780	26,660	2,265	785	3,396
Total	94,214	86,367	55,712	30,655	2,461	1,197	4,189
FUELWOOD							
Softwood	56	11	7	4	1	--	44
Hardwood	11,644	3,147	1,832	1,315	657	--	7,840
Total	11,700	3,158	1,839	1,319	658	--	7,884
ALL PRODUCTS							
Softwood	14,384	12,938	8,939	3,999	197	412	837
Hardwood	91,530	76,587	48,612	27,975	2,922	785	11,236
Total	105,914	89,525	57,551	31,974	3,119	1,197	12,073

Table 68.--Timber products from roundwood by species group and product, Northern Lower Peninsula, Michigan, 1978

Species group	All Products		Pulpwood	Saw logs		Veneer logs	
	[1]/Thousand cubic feet	Cords	[1]/Thousand cubic feet	[2]/Thousand board feet	[1]/Thousand cubic feet	[2]/Thousand board feet	[1]/Thousand cubic feet
SOFTWOODS							
White pine	739	133	7	4,382	725	--	--
Red pine	3,255	30,709	2,423	4,639	767	--	--
Jack pine	8,507	90,252	7,129	5,921	1,109	--	--
White spruce	39	144	10	35	6	--	--
Black spruce	37	134	9	32	5	--	--
Balsam fir	692	922	72	2,844	536	--	--
Hemlock	120	255	17	619	103	--	--
Tamarack	8	--	--	45	8	--	--
Northern white-cedar	987	--	--	2,052	387	--	--
Other softwoods	--	--	--	--	--	--	--
Total	14,384	122,549	9,667	20,569	3,646	--	--
HARDWOODS							
Select white oaks	3,169	17,814	1,392	8,123	1,418	--	--
Select red oaks	14,917	74,126	5,851	41,374	7,261	--	--
Other red oaks	1,533	7,619	601	4,253	746	--	--
Hickory	15	--	--	93	15	--	--
Yellow birch	28	--	--	135	22	42	6
Hard maple	7,277	4,057	319	19,948	3,224	566	79
Soft maple	8,635	58,922	4,647	16,322	2,854	337	46
Beech	1,171	2,696	209	4,500	750	352	49
Ash	2,181	5,114	397	7,459	1,301	152	21
Balsam poplar	640	4,995	396	1,051	182	--	--
Cottonwood	393	--	--	2,146	377	112	16
Bigtooth aspen	22,115	130,694	10,322	44,656	7,850	174	24
Quaking aspen	21,347	126,156	9,963	43,106	7,578	168	23
Basswood	1,798	1,583	126	8,924	1,561	352	49
Yellow-poplar	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--
Elm	3,487	--	--	1,372	237	--	--
Paper birch	2,487	16,059	1,264	2,678	467	40	5
Other hardwoods[3]/	337	1,976	152	443	71	--	--
Total	91,530	451,811	35,639	206,583	35,914	2,295	318
All species	105,914	574,360	45,306	227,152	39,560	2,295	318

(Table 68 continued on next page)

[1]/Small quantities may round off to less than 500 cubic feet and will be shown as a dash in columns showing thousand cubic feet.

[2]/International 1/4-inch rule.

[3]/Includes black cherry.

(Table 68 continued)

Species group	Fuelwood		Posts		Poles		Other Products
	Cords	1/Thousand cubic feet	Thousand pieces	1/Thousand cubic feet	Pieces	1/Thousand cubic feet	1/Thousand cubic feet
SOFTWOODS							
White pine	177	7	--	--	--	--	
Red pine	177	6	--	--	2,908	25	34
Jack pine	604	34	--	--	--	--	235
White spruce	--	--	10	9	--	--	14
Black spruce	--	--	10	9	--	--	14
Balsam fir	--	--	57	56	--	--	28
Hemlock	--	--	--	--	--	--	--
Tamarack	--	--	--	--	--	--	--
Northern white-cedar	128	9	345	351	--	--	240
Other softwoods	--	--	--	--	--	--	--
Total	1,086	56	422	425	2,908	25	565
HARDWOODS							
Select white oaks	5,119	359	--	--	--	--	--
Select red oaks	21,125	1,469	--	--	--	--	336
Other red oaks	2,171	151	--	--	--	--	35
Hickory	--	--	--	--	--	--	--
Yellow birch	--	--	--	--	--	--	--
Hard maple	52,296	3,655	--	--	--	--	--
Soft maple	7,396	517	--	--	--	--	571
Beech	2,417	163	--	--	--	--	--
Ash	6,589	462	--	--	--	--	--
Balsam poplar	884	62	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--
Bigtooth aspen	8,248	575	--	--	--	--	3,344
Quaking aspen	7,961	555	--	--	--	--	3,228
Basswood	933	62	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--
Elm	46,534	3,250	--	--	--	--	--
Paper birch	3,674	250	--	--	--	--	501
Other hardwoods	1,696	114	--	--	--	--	--
Total	167,043	11,644	--	--	--	--	8,015
All species	168,129	11,700	422	425	2,908	25	8,580

Table 69.--Volume of primary plant residue by use and type of residue, Northern Lower Peninsula, Michigan, 1978

(In thousand cubic feet)

Use	Wood residue						Bark[3]	
	Total		Coarse[1]		Fine[2]			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Fiber products[4]	302.2	4,318.9	302.2	4,279.7	--	39.2	--	104.1
Charcoal	--	--	--	--	--	--	--	3.0
Industrial fuel	348.6	1,354.6	110.4	322.2	238.2	1,032.4	230.6	1,041.1
Domestic fuel	465.8	4,134.3	464.0	4,078.2	1.8	56.1	141.6	2,064.5
Miscellaneous[5]	243.2	2,893.5	0.3	14.4	242.9	2,879.1	123.3	1,197.0
Not used[6]	276.3	2,653.5	156.4	967.4	119.9	1,686.1	198.4	1,802.3
Total	1,636.1	15,354.8	1,033.3	9,661.9	602.8	5,692.9	693.9	6,212.0

1/Suitable for chipping such as slabs, edgings, veneer cores, etc.
2/Not suitable for chipping such as sawdust, veneer clippings, etc.
3/Does not include bark disposal at pulpmills.
4/For manufacture of pulp, hardboard, or roofing felt.
5/Livestock bedding, mulch, small dimension, and specialty items.
6/Includes residue burned as waste.

Table 70.--All live shrub[1/] biomass yields on commercial forest land by shrub species group and forest type, Northern Lower Peninsula, Michigan, 1980

(In pounds per acre)

Shrub species group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
TALL SHRUBS															
Balsam fir	0.4	0.4	49.6	426.4	75.6	154.8	269.2	6.0	0.8	55.2	10.4	78.8	182.4	--	--
Tamarack	--	--	--	32.0	159.6	52.8	0.4	60.0	--	4.0	--	--	--	--	--
White spruce	--	--	0.8	32.0	6.8	--	13.2	--	--	--	2.0	2.4	1.2	--	--
Black spruce	0.4	8.4	0.8	6.8	0.8	126.4	27.2	120.4	--	0.4	--	1.2	1.2	--	--
Jack pine	141.6	5.6	--	--	--	--	--	--	34.8	--	--	3.2	--	--	--
Red pine	11.6	27.6	--	--	--	--	--	--	4.4	--	2.0	--	--	--	--
White pine	12.8	28.4	188.8	--	--	--	--	--	45.6	--	7.2	5.6	17.2	--	--
Scotch pine	--	--	--	--	--	--	--	--	--	--	--	--	--	104.8	--
Northern white-cedar	--	--	--	7.6	86.8	48.0	73.6	3.2	--	1.2	5.6	2.8	19.6	--	--
Hemlock	--	--	--	37.6	--	--	0.4	--	--	2.8	4.8	0.4	--	--	--
Red maple	12.4	41.6	6.0	6.8	138.8	--	36.0	10.4	88.0	91.2	60.8	93.6	55.6	2.8	--
Silver maple	--	--	--	--	--	--	--	--	--	7.2	--	4.4	--	--	--
Sugar maple	--	13.2	--	1.2	--	--	--	--	0.4	0.4	131.6	8.4	1.6	0.4	--
Mountain maple	--	--	--	--	--	--	22.8	--	--	70.0	0.8	12.4	6.0	--	--
Red alder	--	--	14.4	--	--	--	0.4	--	--	--	--	3.6	--	--	--
Green alder	50.4	--	--	--	--	356.8	--	--	3.6	0.8	0.4	2.0	0.8	--	--
Speckled alder	60.0	0.8	66.8	481.2	332.4	2,097.2	297.6	2,477.2	18.0	633.6	30.8	111.2	306.8	--	665.2
Yellow birch	--	--	--	--	--	--	--	--	--	3.2	2.4	0.8	--	17.2	--
Paper birch	0.8	--	2.8	1.2	3.6	--	0.4	--	--	7.6	7.6	6.8	11.2	--	--
American hornbeam	--	38.4	--	--	--	--	--	--	2.0	2.0	6.4	1.2	2.4	--	--
Dogwood	2.0	0.8	195.2	98.4	168.4	57.2	156.8	47.2	20.4	244.8	33.2	158.0	446.4	0.8	67.2
Hawthorn	8.8	26.4	--	--	--	--	--	--	5.6	2.4	2.0	3.6	--	--	--
Beech	--	7.6	--	--	--	--	--	0.4	1.2	0.4	19.2	2.4	--	--	--
White ash	--	2.8	--	0.8	--	--	0.4	--	6.0	16.0	39.2	23.2	28.0	1.2	--
Black ash	--	--	--	1.2	--	--	88.4	3.2	--	126.0	5.6	21.2	10.0	--	--
Green ash	--	0.4	--	--	--	--	11.2	--	0.4	85.2	5.2	15.2	3.6	--	--
Black alder	--	--	--	--	--	--	12.4	18.0	--	64.4	8.0	1.2	--	--	--
Mountain holly	--	--	--	--	2.4	--	--	0.4	--	31.6	--	--	2.8	--	--
Spice bush	--	--	--	--	--	--	--	--	--	15.2	11.2	--	--	--	0.4
Eastern hophornbeam	--	--	--	--	--	--	--	--	8.0	--	104.0	30.0	1.2	23.2	--
Balsam poplar	--	--	--	10.0	5.6	--	18.0	--	--	12.8	0.4	14.0	24.0	--	--
Bigtooth aspen	2.0	6.0	--	--	--	--	--	--	7.2	--	5.2	85.6	56.8	18.4	--
Quaking aspen	6.0	21.6	1.6	3.6	3.6	--	5.2	12.4	5.6	23.2	40.8	196.8	50.0	22.0	--
Pincherry	18.0	0.4	--	0.4	--	--	--	--	3.6	1.6	2.0	2.8	--	--	--
Black cherry	29.6	36.8	19.6	64.4	2.8	48.4	3.6	--	126.0	21.6	60.4	86.4	10.8	17.2	1.2
Chokecherry	8.4	2.8	1.2	0.4	0.4	--	4.4	2.4	15.2	13.2	14.0	23.6	4.0	4.8	1.2
White oak	9.2	0.8	27.2	--	0.4	--	--	--	70.0	1.2	9.6	6.8	--	0.8	--
Northern pin oak	--	--	--	6.4	--	--	--	--	--	--	--	--	--	--	--
Northern red oak	90.4	23.6	8.0	1.2	1.2	--	0.8	--	189.6	3.2	18.8	43.2	2.4	12.8	3.2
Black oak	12.4	--	0.4	--	--	--	--	--	25.2	0.4	--	2.8	--	--	--
Sweet gale	--	--	--	--	--	--	--	--	--	44.0	--	0.4	--	--	--

(Table 70 continued on next page)

(Table 70 continued)

Shrub species group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
TALL SHRUBS (continued)															
Mountain ash	--	--	--	--	--	--	16.4	--	--	--	--	--	--	--	--
Witch hazel	--	--	21.6	--	--	--	--	--	41.2	7.6	14.0	64.4	28.0	--	--
Juneberry	23.2	13.6	68.8	0.4	6.8	--	33.6	5.6	19.2	7.6	24.4	45.6	14.4	1.6	11.2
Hazel	--	26.0	2.0	--	8.0	--	22.8	--	21.6	31.6	24.4	29.2	--	--	--
Prickly ash	--	--	--	--	--	--	--	--	1.6	4.4	2.8	--	--	--	--
Alder buckthorn	--	--	--	0.8	--	0.4	6.8	0.4	--	6.4	--	0.4	--	--	--
Viburnum	10.4	17.6	0.8	122.4	0.8	10.8	74.4	20.0	38.8	191.6	11.6	90.0	135.6	0.4	--
Elder	--	--	--	--	--	--	3.6	--	0.4	10.4	6.4	2.8	0.4	--	1.2
Sumac	--	48.0	--	--	--	--	1.2	0.4	4.8	--	18.0	18.0	--	4.0	6.8
Willow	84.0	1.2	--	170.0	--	--	4.8	47.6	1.6	60.4	10.4	69.2	139.6	25.6	33.2
Sassafras	--	2.0	0.4	--	--	--	--	--	14.0	1.2	3.2	2.4	--	--	--
American basswood	--	--	--	--	--	--	--	--	0.4	3.6	10.0	0.4	1.6	--	--
American elm	17.2	--	--	--	--	--	0.4	0.4	1.2	29.6	8.8	5.6	188.4	0.8	--
Total	612.0	402.8	676.8	1,513.2	1,004.8	2,952.8	1,206.4	2,835.6	826.4	1,941.2	785.6	1,384.0	1,754.0	258.8	790.8
LOW SHRUBS															
Common juniper	--	--	20.8	--	--	--	--	--	--	--	--	--	--	--	--
Yew	--	--	--	--	--	5.7	2.5	4.3	--	--	3.9	--	--	--	--
Holly	--	--	--	--	--	--	2.7	--	--	1.6	--	--	--	--	--
Virginia creeper	--	--	--	--	--	--	--	--	--	2.0	1.1	--	2.1	--	--
Spirea	--	--	--	--	--	--	--	5.7	--	1.5	--	--	2.0	--	--
Labrador tea	--	--	41.3	31.1	--	472.0	9.7	--	--	83.0	--	--	--	--	--
Leatherleaf	57.7	--	193.8	--	--	466.7	1.6	338.4	12.4	37.7	--	24.1	--	--	--
Bog laurel	2.9	--	--	--	--	28.2	1.7	2.7	--	1.0	--	--	--	--	--
Sweetfern	50.0	13.3	1.6	--	--	--	--	--	23.3	--	6.8	6.9	--	5.7	1.2
Gooseberry-currant	--	--	--	2.6	--	--	1.1	1.0	--	13.5	--	--	2.9	--	--
Chokeberry	--	--	--	--	--	--	--	--	--	--	--	--	1.1	--	--
Raspberry-blackerry	11.0	21.2	37.7	1.8	2.0	61.6	9.9	66.2	14.4	30.8	35.0	38.6	72.2	49.2	6.4
Rose	--	--	--	2.7	--	--	--	--	1.1	1.6	--	--	--	--	--
Bilberry-blueberry	463.2	137.8	3.4	61.3	14.3	105.4	7.5	4.7	166.8	12.4	25.0	41.4	12.6	--	16.1
Bush honeysuckle	--	4.4	--	7.6	--	--	--	--	1.6	--	--	1.8	2.8	--	--
Honeysuckle	--	8.4	--	8.7	--	3.9	3.4	2.8	3.7	5.6	4.6	5.1	2.9	--	--
Bearberry	10.0	--	--	--	--	--	2.1	--	--	1.2	--	--	--	--	--
Bog rosemary	--	--	--	--	--	2.0	--	5.2	--	--	--	1.0	--	--	--
Grape	--	--	--	--	--	--	--	--	--	4.7	--	--	1.1	--	--
Total	594.8	185.1	298.6	115.8	16.3	1,145.5	42.2	431.0	233.3	196.6	76.4	118.9	99.7	54.9	23.7
All shrubs	1,206.8	587.9	975.4	1,629.0	1,021.1	4,098.3	1,248.6	3,266.6	1,049.7	2,137.8	862.0	1,502.9	1,853.7	313.7	814.5
Number of plots[2/]	128	84	29	20	8	13	133	12	321	161	633	633	45	27	20

[1/] Trees under 1.0-inch d.b.h. are also included. Low shrub species that averaged less than 1.0 pound per acre are not included.
[2/] Number of plots by forest type from which average yields were derived.

Table 71.--All live tree biomass yields on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1980

(In pounds per acre)

Shrub species group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS															
White pine	1,684	5,440	101,416	8,600	2,928	5,992	4,828	4,652	2,792	3,104	3,504	2,716	2,576	192	644
Red pine	11,732	147,828	22,628	1,548	--	--	624	--	4,580	728	2,024	3,212	2,984	13,796	560
Jack pine	109,992	17,604	5,352	164	--	--	--	3,140	8,172	124	1,260	1,540	--	3,224	764
White spruce	--	404	2,852	9,388	55,904	1,000	5,632	--	--	596	80	588	668	32	--
Black spruce	156	140	1,684	5,796	2,380	57,344	10,004	9,704	16	336	8	116	140	--	--
Balsam fir	48	448	4,148	72,256	28,152	10,304	26,676	10,572	244	4,212	692	4,864	11,156	--	332
Hemlock	--	644	--	--	--	--	4,120	--	92	2,220	5,980	640	2,772	--	--
Tamarack	32	--	--	828	1,516	6,300	11,560	87,096	16	612	140	104	1,128	--	468
Northern white-cedar	--	440	1,364	13,848	24,820	22,400	151,340	14,352	48	13,708	2,836	5,204	15,216	188	132
Other softwoods	--	1,244	14,012	--	8,172	--	1,024	--	72	28	204	140	--	141,712	192
Total	123,644	174,192	153,456	112,428	123,872	103,340	215,808	129,516	16,032	25,668	16,728	19,124	36,640	159,144	3,092
HARDWOODS															
Select white oaks	1,340	4,332	11,472	--	--	--	--	--	48,104	2,252	2,244	2,520	1,248	1,296	--
Select red oaks	13,956	7,548	13,212	64	--	--	--	--	99,040	1,804	12,484	13,472	8,224	3,800	500
Other red oaks	6,132	6,812	--	--	--	--	--	--	32,348	272	632	932	--	--	--
Hickory	--	268	--	--	--	--	--	--	--	--	260	--	308	--	--
Yellow birch	--	--	928	--	--	--	1,960	--	76	4,052	3,824	212	2,904	416	--
Hard maple	52	872	--	1,980	--	--	368	--	928	2,844	94,848	3,132	6,700	4,220	1,516
Soft maple	2,032	5,292	9,024	17,664	1,440	2,860	11,088	5,080	17,900	77,944	36,148	21,688	24,524	1,156	1,376
Beech	--	220	712	--	--	--	--	--	516	216	16,720	900	2,916	--	--
Ash	--	324	784	2,804	--	--	14,652	1,996	1,100	46,348	15,776	3,660	9,044	268	1,576
Balsam poplar	--	--	--	1,944	11,052	6,820	6,208	1,364	36	3,780	380	6,180	3,212	3,972	132
Cottonwood	--	--	--	--	--	--	--	--	20	2,584	188	268	--	--	--
Bigtooth aspen	1,264	3,576	7,496	1,032	1,492	--	2,008	--	14,900	2,344	11,400	47,228	7,104	3,996	1,024
Quaking aspen	3,596	4,388	13,640	30,560	16,752	5,712	7,464	1,552	3,488	13,276	11,956	51,568	19,544	2,568	1,564
Basswood	184	252	--	--	--	--	800	--	424	4,668	26,892	1,252	4,688	1,100	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	92	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	560	1,244	1,108	1,544	--	448	272	--	1,492	1,644	8,736	2,796	932	1,376	6,752
Butternut	--	--	--	--	--	--	--	--	16	--	16	--	--	--	--
Elm	120	--	232	44	--	1,580	1,044	--	28	4,888	3,800	596	1,440	372	548
Paper birch	120	368	5,064	30,284	576	5,260	19,596	5,780	2,040	9,404	6,304	9,120	91,132	--	--
Other hardwoods	--	80	--	--	--	--	244	--	880	2,360	532	308	264	--	--
Noncommercial species	60	308	--	--	--	608	240	--	232	412	3,988	992	1,388	508	1,076
Total	29,416	35,976	63,672	87,920	31,312	23,288	65,944	15,772	223,568	181,092	257,128	166,824	185,572	25,048	16,064
All species	153,060	210,168	217,128	200,348	155,184	126,628	281,752	145,288	239,600	206,760	273,856	185,948	222,212	184,192	19,156
Number of plots[1/]	201	153	32	22	9	13	146	13	418	187	707	744	51	27	29

[1/] Number of plots by forest type from which average yields were derived.

Table 72.--All live tree biomass on commercial forest land by species group and forest type, Northern Lower Peninsula, Michigan, 1980

(In green tons)

Species group	All types	Forest type						
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	7,178,962	213,273	580,863	1,906,644	110,505	16,036	41,935	429,082
Red pine	21,656,416	1,486,296	15,780,795	425,372	19,909	--	--	55,291
Jack pine	19,415,814	13,933,148	1,879,235	100,612	2,117	--	--	--
White spruce	1,411,468	--	43,191	53,654	120,621	306,074	7,007	500,387
Black spruce	1,618,318	19,947	14,992	31,693	74,491	13,031	401,411	889,138
Balsam fir	7,062,318	5,890	47,746	78,003	928,490	154,135	72,115	2,370,831
Hemlock	3,544,701	--	68,955	--	--	--	--	366,156
Tamarack	1,972,926	4,158	--	--	10,650	8,305	44,095	1,027,425
Northern white-cedar	19,525,237	--	46,764	25,674	177,939	135,884	156,810	13,450,462
Other softwoods	2,732,059	--	132,607	263,422	--	44,735	--	91,066
Total	86,118,219	15,662,712	18,595,148	2,885,074	1,444,722	678,200	723,373	19,179,838
HARDWOODS								
Select white oaks	16,058,543	169,752	462,512	215,694	--	--	--	--
Select red oaks	41,062,175	1,768,090	805,828	248,414	843	--	--	--
Other red oaks	10,856,560	776,651	727,212	--	--	--	--	--
Hickory	144,715	--	28,639	--	--	--	--	--
Yellow birch	2,408,314	--	--	17,480	--	--	--	174,239
Hard maple	41,820,319	6,661	93,196	--	25,426	--	--	32,820
Soft maple	40,776,684	257,554	565,038	169,617	226,993	7,879	20,014	985,365
Beech	7,637,268	--	23,395	13,403	--	--	--	--
Ash	15,026,373	--	34,607	14,738	36,042	--	--	1,302,124
Balsam poplar	4,216,178	--	--	--	24,967	60,503	47,750	551,776
Cottonwood	474,245	--	--	--	--	--	--	--
Bigtooth aspen	31,578,120	160,326	381,690	140,888	13,250	8,158	--	178,534
Quaking aspen	33,711,137	455,569	468,549	256,416	392,677	91,707	39,992	663,301
Basswood	12,614,222	23,056	26,847	--	--	--	--	71,241
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	9,766	--	9,766	--	--	--	--	--
Black cherry	5,895,848	70,864	132,929	20,808	19,848	--	3,143	24,045
Butternut	11,465	--	--	--	--	--	--	--
Elm	2,543,500	14,966	--	4,387	551	--	11,062	92,646
Paper birch	13,246,355	15,135	39,143	95,183	389,142	3,159	36,833	1,741,417
Other hardwoods	879,737	--	8,601	--	--	--	--	21,671
Noncommercial species	2,341,574	7,445	32,723	--	--	--	4,266	21,255
Total	283,313,098	3,726,069	3,840,675	1,197,028	1,129,739	171,406	163,060	5,860,434
All species	369,431,317	19,388,781	22,435,823	4,082,102	2,574,461	849,606	886,433	25,040,272

(Table 72 continued on next page)

(Table 72 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	35,591	745,705	322,953	1,455,841	1,234,316	73,325	2,741	10,152
Red pine	--	1,222,624	75,887	840,627	1,458,568	84,934	197,282	8,831
Jack pine	24,027	2,181,664	12,957	523,549	700,350	--	46,112	12,043
White spruce	--	--	61,959	32,789	266,276	19,031	479	--
Black spruce	74,225	4,247	34,935	3,725	52,549	3,934	--	--
Balsam fir	80,876	64,971	438,346	287,549	2,210,445	317,691	--	5,230
Hemlock	--	24,573	231,038	2,484,967	290,073	78,939	--	--
Tamarack	666,285	3,760	63,734	58,671	46,376	32,087	--	7,380
Northern white-cedar	109,799	13,237	1,426,671	1,178,960	2,365,003	433,233	2,689	2,112
Other softwoods	--	19,465	3,020	84,617	63,605	--	2,026,489	3,033
Total	990,803	4,280,246	2,671,500	6,951,295	8,687,561	1,043,174	2,275,792	48,781
HARDWOODS								
Select white oaks	--	12,844,466	234,262	932,821	1,145,017	35,497	18,522	--
Select red oaks	--	26,446,283	187,664	5,187,637	6,121,025	234,128	54,352	7,911
Other red oaks	--	8,638,251	28,130	262,804	423,512	--	--	--
Hickory	--	--	--	107,274	--	8,802	--	--
Yellow birch	--	20,036	421,889	1,589,908	96,100	82,731	5,931	--
Hard maple	--	248,290	296,044	39,419,192	1,423,599	190,742	60,365	23,984
Soft maple	38,851	4,779,637	8,112,015	15,022,396	9,854,704	698,348	16,524	21,749
Beech	--	137,375	22,273	6,948,624	409,221	82,977	--	--
Ash	15,260	294,189	4,823,770	6,556,213	1,663,241	257,487	3,817	24,885
Balsam poplar	10,436	10,082	393,412	158,309	2,808,593	91,501	56,773	2,076
Cottonwood	--	5,107	268,894	78,477	121,767	--	--	--
Bigtooth aspen	--	3,978,331	243,996	4,737,276	21,460,049	202,301	57,125	16,196
Quaking aspen	11,868	931,813	1,381,896	4,968,954	23,430,422	556,548	36,735	24,690
Basswood	--	112,924	486,004	11,176,319	568,673	133,438	15,720	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	398,902	170,912	3,631,446	1,270,102	26,513	19,678	106,658
Butternut	--	4,416	--	7,049	--	--	--	--
Elm	--	6,975	508,750	1,578,806	270,361	41,008	5,341	8,647
Paper birch	44,216	544,897	978,616	2,619,534	4,144,084	2,594,996	--	--
Other hardwoods	--	235,460	245,665	221,632	139,193	7,515	--	--
Noncommercial species	--	61,441	42,705	1,656,797	451,142	39,569	7,245	16,986
Total	120,631	59,698,875	18,846,897	106,861,468	75,800,805	5,284,101	358,128	253,782
All species	1,111,434	63,979,121	21,518,397	113,812,763	84,488,366	6,327,275	2,633,920	302,563

Table 73.--All live tree biomass by species group and tree biomass component, Northern Lower Peninsula, Michigan, 1980

Species group	All components	Biomass component				
		1- to 5-inch trees	Growing stock		Cull	
			Boles	Tops and limbs	Boles	Tops and limbs
				Green tons		
SOFTWOODS						
White pine	7,178,962	1,306,735	3,937,307	1,728,968	121,939	84,013
Red pine	21,656,416	4,362,086	11,642,347	5,482,052	102,179	67,752
Jack pine	19,415,814	4,479,292	9,828,555	4,328,480	468,099	311,388
White spruce	1,411,468	247,745	774,054	366,026	13,005	10,638
Black spruce	1,618,318	620,904	667,597	310,754	10,558	8,505
Balsam fir	7,062,318	2,658,283	2,963,401	1,366,885	41,344	32,405
Hemlock	3,544,701	589,788	1,912,786	828,736	132,919	80,472
Tamarack	1,972,926	827,396	689,433	355,356	54,994	45,747
Northern white-cedar	19,525,237	7,528,357	7,159,363	3,421,541	859,150	556,826
Other softwoods	2,732,059	1,447,113	734,852	326,100	139,749	84,245
Total	86,118,219	24,067,699	40,309,695	18,514,898	1,943,936	1,281,991
HARDWOODS						
Select white oaks	16,058,543	1,720,883	9,076,322	4,105,680	737,356	418,302
Select red oaks	41,062,175	1,959,293	25,510,211	11,493,568	1,316,283	782,820
Other red oaks	10,856,560	467,847	6,481,741	2,886,111	640,340	380,521
Hickory	144,715	47,580	66,958	30,177	--	--
Yellow birch	2,408,314	304,173	1,214,831	546,400	200,159	142,751
Hard maple	41,820,319	8,074,885	22,034,852	9,922,928	1,110,098	677,556
Soft maple	40,776,684	8,347,213	20,662,624	9,826,922	1,199,905	740,020
Beech	7,637,268	758,906	3,701,035	1,765,880	861,431	550,016
Ash	15,026,373	3,640,754	7,354,001	3,321,567	445,278	264,773
Balsam poplar	4,216,178	447,917	2,402,917	1,100,621	161,369	103,354
Cottonwood	474,245	--	292,897	152,579	16,010	12,759
Bigtooth aspen	31,578,120	4,617,164	17,209,926	8,019,904	1,025,183	705,943
Quaking aspen	33,711,137	7,130,678	16,215,642	7,851,153	1,447,266	1,066,398
Basswood	12,614,222	397,204	8,205,384	3,571,045	280,366	160,223
Yellow-poplar	--	--	--	--	--	--
Black walnut	9,766	--	6,768	2,998	--	--
Black cherry	5,895,848	1,065,326	2,614,342	1,164,970	674,420	376,790
Butternut	11,465	--	7,761	3,704	--	--
Elm	2,543,500	882,186	950,203	463,485	161,187	86,439
Paper birch	13,246,355	1,677,544	7,254,204	3,501,384	498,898	314,325
Other hardwoods	879,737	275,126	315,217	155,317	81,274	52,803
Noncommercial species	2,341,574	1,306,915	--	--	681,638	353,021
Total	283,313,098	43,121,594	151,577,836	69,886,393	11,538,461	7,188,814
All species	369,431,317	67,189,293	191,887,531	88,401,291	13,482,397	8,470,805

(Table 73 continued on next page)

(Table 73 continued)

Species group	All components	Biomass component: 1- to 5-inch trees	Growing stock: Boles	Growing stock: Tops and limbs	Cull: Boles	Cull: Tops and limbs
			Thousand cubic feet			
SOFTWOODS						
White pine	396,800	72,295	217,605	95,556	6,717	4,627
Red pine	1,055,580	211,495	568,168	267,536	5,038	3,343
Jack pine	815,281	186,443	413,248	181,995	20,164	13,431
White spruce	80,079	14,037	43,933	20,775	734	600
Black spruce	99,078	37,918	40,947	19,060	639	514
Balsam fir	322,259	121,383	135,125	62,328	1,918	1,505
Hemlock	149,206	24,549	80,570	34,909	5,712	3,466
Tamarack	86,332	36,369	30,025	15,479	2,431	2,028
Northern white-cedar	1,335,910	513,006	491,859	235,062	58,280	37,703
Other softwoods	130,366	68,766	35,173	15,614	6,745	4,068
Total	4,470,891	1,286,261	2,056,653	948,314	108,378	71,285
HARDWOODS						
Select white oaks	566,801	59,086	320,909	145,173	26,545	15,088
Select red oaks	1,435,654	67,272	891,459	401,752	47,078	28,093
Other red oaks	375,510	15,833	223,745	99,659	22,735	13,538
Hickory	4,988	1,610	2,328	1,050	--	--
Yellow birch	90,255	11,266	45,340	20,393	7,723	5,533
Hard maple	1,584,077	303,853	835,216	376,120	42,744	26,144
Soft maple	1,764,871	360,182	894,415	425,465	52,412	32,397
Beech	298,124	29,501	144,145	68,774	33,976	21,728
Ash	623,985	147,479	307,792	139,047	18,589	11,078
Balsam poplar	213,955	22,651	121,935	55,856	8,235	5,278
Cottonwood	20,276	--	12,504	6,512	700	560
Bigtooth aspen	1,511,790	219,343	824,271	384,153	49,738	34,285
Quaking aspen	1,609,456	338,750	774,206	374,890	69,980	51,630
Basswood	627,834	19,664	408,380	177,734	14,030	8,026
Yellow-poplar	--	--	--	--	--	--
Black walnut	364	--	252	112	--	--
Black cherry	267,088	47,719	118,430	52,779	30,882	17,278
Butternut	520	--	352	168	--	--
Elm	99,966	34,293	37,525	18,307	6,404	3,437
Paper birch	551,619	69,825	301,836	145,708	20,993	13,257
Other hardwoods	36,989	11,452	13,244	6,530	3,488	2,275
Noncommercial species	98,531	54,398	--	--	29,062	15,071
Total	11,782,653	1,814,177	6,278,284	2,900,182	485,314	304,696
All species	16,253,544	3,100,438	8,334,937	3,848,496	593,692	375,981

Table 74.--Sampling errors[1/] for estimates smaller than the Unit totals of volume, net growth, removals, and area of commercial forest land, Northern Lower Peninsula, Michigan, 1980

Sampling error	Commercial forest area	Growing Stock: Inventory	Growing Stock: Growth	Growing Stock: Removals	Sawtimber: Inventory	Sawtimber: Growth	Sawtimber: Removals
Percent	Thousand acres	Million cubic feet			[2/]Million board feet		
1	1,892.6	10,035.2	732.3	18,764.0	54,695.2	7,489.2	78,153.3
2	473.1	2,508.8	183.1	4,691.0	13,673.8	1,872.3	19,538.3
3	210.3	1,115.0	81.4	2,084.9	6,077.2	832.1	8,683.7
4	118.3	627.2	45.8	1,172.8	3,418.5	468.1	4,884.6
5	75.7	401.4	29.3	750.6	2,187.8	299.6	3,126.1
10	18.9	100.4	7.3	187.6	547.0	74.9	781.5
15	8.4	44.6	3.3	83.4	243.1	33.3	347.3
20	4.7	25.1	1.8	46.9	136.7	18.7	195.4
25	3.0	16.1	1.2	30.0	87.5	12.0	125.0
50	0.8	4.0	0.3	7.5	21.9	3.0	31.3
100	0.2	1.0	0.1	1.9	5.5	0.7	7.8

[1/]At the 68-percent probability level.
[2/]International 1/4-inch rule.

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Timber resource of Michigan's Northern Lower Peninsula, 1980.
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The fourth inventory of the timber resource of Michigan's Northern Lower Peninsula Survey Unit shows a 4-percent decline in commercial forest area and a 38 percent gain in growing-stock volume between 1966 and 1980. Presented are highlights and statistics on area, volume, growth, mortality, removals, utilization, and biomass.

KEY WORDS: Timber resource, statistics, area, volume, growth, mortality, removals.